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WATER SUPPLY

OF

ST. MARY AND MILK RIVERS

1898–1917

BY

B. E. JONES
United States Geological Survey

AND

R. J. BURLEY
Reclamation Service of Canada

Prepared under the direction of the
United States Geological Survey, United States Reclamation Service
and Reclamation Service of Canada

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LETTER OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR, CANADA,
RECLAMATION SERVICE,
Ottawa, May 19, 1919.

INTERNATIONAL JOINT COMMISSION,
Washington, D. C., and Ottawa, Canada.

GENTLEMEN: In accordance with the authorization of the International Joint Commission contained in its Order No. 157, made at New York City February 4, 1918, there are transmitted herewith records of flow of streams and canals in the St. Mary and Milk River basins, collected by the United States Geological Survey in cooperation with the United States Reclamation Service and by the Reclamation Service of Canada.

Respectfully submitted.

JOHN C. HOYT,
Chief, division of surface waters,
United States Geological Survey.
E. F. DRAKE,
Director, Reclamation Service of Canada.

WATER SUPPLY OF ST. MARY AND MILK RIVERS, 1898–1917.

By B. E. Jones and R. J. Burley.

AUTHORIZATION OF WORK.

On January 12, 1918, the Secretary of the Interior suggested to the International Joint Commission that the commission should arrange for the compilation and publication of all stream-flow data collected at both the international and national stations in the Milk and St. Mary River basins, the data to be agreed upon by the United States Geological Survey, represented by John C. Hoyt, hydraulic engineer, and the Irrigation Branch [now the Reclamation Service] of the Department of the Interior, Canada, represented by E. F. Drake, superintendent of irrigation, and to be published in the regular reports of the commission.

The commission's favorable action on this suggestion was communicated to the Secretary of the Interior under date of February 18, 1918, by Mr. Whitehead Kluttz, the secretary of the commission, who stated that a similar suggestion had been made by the Canadian superintendent of irrigation.

Under the authority thus conferred on Messrs. Hoyt and Drake, Mr. B. E. Jones, hydraulic engineer of the United States Geological Survey, was directed to compile the records collected in the United States, and Mr. R. J. Burley, chief engineer, drainage division, of the Canadian Reclamation Service, was directed to compile the Canadian records.

SCOPE OF REPORT.

Hydrometric work in the area drained by St. Mary and Milk rivers was begun in 1897, when the United States Geological Survey established a station on Milk River at Chinook, Mont. In 1898 this station was moved to Havre, Mont., about 20 miles upstream. In Canada records were first collected at a station established by the Alberta Railway & Irrigation Co. in 1905 on St. Mary River at Kimball, Alta. Additional stations have been established from time to time in both countries, and at the end of December, 1917, records had been obtained at 79 gaging stations on the main streams and their tributaries and at 41 stations on canals.

Most of the records here assembled appear as originally published in the reports of the Reclamation Service of Canada [1] and the United States Geological Survey, but some have been revised to free them from errors indicated by later data. The most notable need for such revisions was in the older estimates of winter flow, many of which, for stations on Milk River, were based on inadequate data and have therefore been omitted from the compilation. Tables of daily discharge not heretofore published have been taken from the original records.

DEFINITION OF TERMS.

The volume of water flowing in a stream—the "run-off" or "discharge"—is expressed in various terms, each of which has become associated with a certain class of work. These terms may be divided into two groups—(1) those that represent the rate of flow, as second-feet, gallons per minute, miner's inches, and discharge in second-feet per square mile, and (2) those that represent the actual quantity of water, as run-off in depth of inches, acre-feet, and millions of cubic feet. The principal terms used in this report are second-feet, second-feet per square mile, run-off in inches, and acre-feet. They may be defined as follows:

"Second-feet" is an abbreviation for "cubic feet per second." A second-foot is the rate of discharge of water flowing in a channel of rectangular cross section 1 foot wide and 1 foot deep at an average velocity of 1 foot per second. It is generally used as a fundamental unit from which others are computed by the use of the factors given in the tables of convenient equivalents.

"Second-feet per square mile" is the average number of cubic feet of water flowing per second from each square mile of area drained, on the assumption that the run-off is distributed uniformly both as regards time and area.

"Run-off (depth in inches)" is the depth to which an area would be covered if all the water flowing from it in a given period were uniformly distributed on the surface. It is used for comparing run-off with rainfall, which is usually expressed in depth in inches.

An "acre-foot," equivalent to 43,560 cubic feet, is the quantity required to cover an acre to the depth of 1 foot. The term is commonly used in connection with storage for irrigation.

The following terms not in common use are here defined:

"Stage-discharge relation," an abbreviation for the term "relation of gage height to discharge."

"Control," "controlling section," and "point of control," terms used to designate the section or sections of the stream below the gage which determine the stage-discharge relation at the gage. It should

[1] Formerly Irrigation Branch, Department of the Interior, Canada.

be noted that the control may not be the same section or sections at all stages.

The "point of zero flow" for a given gaging station is that point on the gage—the gage height—to which the surface of the river would fall if there were no flow.

EXPLANATION OF DATA.

The base data collected at gaging stations consist of records of stage, measurements of discharge, and general information used to supplement the gage heights and discharge measurements in determining the daily flow. The records of stage are obtained either from direct readings on a staff gage or from a water-stage recorder that gives a continuous record of the fluctuations. Measurements of discharge are made with a current meter by the general methods outlined in standard textbooks on the measurement of river discharge.

From the discharge measurements rating tables are prepared that give the discharge for any stage, and these rating tables, when applied to the gage heights, give the discharge from which the daily, monthly, and yearly mean discharge is determined.

The data presented for each gaging station in the area covered by this report comprise a description of the station, a table giving results of discharge measurements, a table showing the daily discharge of the stream, and a table of monthly and yearly discharge and run-off.

If the base data are insufficient to determine the daily discharge, tables giving daily gage heights and results of discharge measurements are published.

The description of the station gives, in addition to statements regarding location and equipment, information in regard to any conditions that may affect the constancy of the stage-discharge relation, covering such subjects as the occurrence of ice, the use of the stream for log driving, shifting of channel, and the cause and effect of backwater; it gives also information as to diversions that decrease the flow at the gage, artificial regulation, maximum and minimum recorded stages, and the accuracy of the records.

The table of daily discharge in general gives the discharge in second-feet corresponding to the mean of the gage heights read each day. At stations on streams subject to sudden or rapid diurnal fluctuation the discharge obtained from the rating table and the mean daily gage height may not be the true mean discharge for the day. If such stations are equipped with water-stage recorders the mean daily discharge may be obtained by weighting discharge for parts of the day.

In the table of monthly discharge the column headed "Maximum" gives the mean flow for the day when the mean gage height was highest. As the gage height is the mean for the day it does not

indicate correctly the stage when the water surface was at crest height and the corresponding discharge was consequently larger than given in the maximum column. Likewise, in the column headed "Minimum" the quantity given is the mean flow for the day when the mean gage height was lowest. The column headed "Mean" is the average flow in cubic feet for each second during the month. On this average flow computations recorded in the remaining columns, which are defined on page 10, are based.

ACCURACY OF STREAM-FLOW DATA.[1]

By N. C. Grover and J. C. Hoyt.

DEGREE OF ACCURACY REQUIRED.

The laws relating to many natural phenomena have been reduced to an exact science; those for many more are largely empirical and are based on experiments and assumptions that only approximate the truth. In the empirical class are included the laws of the science of hydrology and especially of that branch of hydrology which relates to the flow of water in open channels. It is possible, nevertheless, by carefully considering the various factors, to reduce the incidental errors so that resulting records will be sufficiently accurate for the purposes for which stream-flow data are required.

In most problems two degrees of accuracy must be considered—first, that which is practicable or possible to obtain, and, second, that which is desirable or necessary. The obtainable accuracy of stream-flow data depends largely on the amount of money available for their collection. The desirable accuracy depends on the proposed use of the data.

Stream-flow records have three principal uses—first, in predicting flow, generally in connection with the design of hydraulic works; second, in the immediate operation of hydraulic works; and, third, in studying conditions of past flow, usually in connection with the adjustment of water rights. For the second and third uses data as accurate as can be collected may be needed. In considering the first use, however, it should be remembered that both the total flow of a stream and its regimen change from year to year, and that the conditions existing at any particular time may never recur. For this use, therefore, reasonably accurate records that extend over a considerable period are much more valuable than extremely accurate data covering a short period.

Studies of the accuracy of stream-flow data serve to determine the methods to be followed in their collection so that the records may meet the requirements of the proposed uses. Notes on accuracy that accompany stream-flow records should give, first, information by

[1] Republished from Contributions to the hydrology of the United States, 1916: U. S. Geol. Survey Water-Supply Paper 400, pp. 53-59, 1916.

which the technical man may study the records and judge their accuracy, and, second, information by which both the general and the technical user may judge the reliability of the records without making a study. These two uses should be kept in mind in preparing the data as well as the notes. Consideration of the accuracy of records to be collected at any station should begin with the reconnaisance for the site and continue through the selection, establishment, maintenance, and operation of the station, the computation and interpretation of the data, and the preparation of the records for publication. In other words, records should be collected with the desired degree of accuracy in view instead of leaving it to be determined after the field data are collected and estimates have been made.

In this discussion of accuracy it has been assumed that personal or instrumental errors, both in field and office, are reduced to a negligible amount. In order that this assumption may be true, however, all operations connected with the work must be carefully conducted and instruments must be kept in proper working order.

The conditions affecting accuracy may introduce errors that may be consistently compensating, consistently cumulative, or alternately compensating and cumulative. Therefore care must be taken to determine the way in which the incidental errors affect the results.

CONDITIONS AFFECTING ACCURACY OF RECORDS OF DAILY DISCHARGE.

The obtainable accuracy of records of daily discharge of a stream depends on the following factors, information in regard to which will determine the methods of operation and give a basis for evaluating the records after they are collected:

1. Permanence of the stage-discharge relation.
2. Precision with which the discharge rating curve is defined.
3. Refinement of gage readings.
4. Frequency of gage readings.
5. Methods of applying the daily gage heights to the rating table to obtain the daily discharge.

Permanence of the stage-discharge relation.—The permanence of the relation of discharge to stage as determined by the control is a fundamental factor in the collection of records of daily discharge of a stream. It may be disturbed either by a change in the control itself or by conditions that counteract the effect of the control, such as backwater from log or ice jams or floods in tributary streams below the station. The general character of the control and the conditions that may affect it are determined by inspection. The effectiveness of the control, however, can be finally determined only by plotting the results of discharge measurements. If such plotting does not define a smooth curve the inconsistency is due to poor

current-meter measurements of discharge, to instability of the control, or to disturbing influences. If the control is unstable the accuracy of the record will depend on the number of the discharge measurements and their distribution as to time and stage.

Errors due to lack of permanence of the stage-discharge relation may be either compensating or cumulative, according to the physical conditions affecting the nature and stability of the control.

Precision of the discharge rating curve.—The precision with which the discharge rating curve is defined depends on the accuracy of the discharge measurements, their distribution in range, and the permanence of the control. If the relation of the discharge to stage were permanent and truly defined by the rating curve and the discharge measurements were absolutely accurate a series of measurements for a station would plot on a smooth curve. Unfortunately, such ideal conditions do not exist; therefore, a series of measurements for a station will plot somewhat discordantly, and the rating curve should be drawn among them in such a way as to represent average conditions. For permanent conditions of control combined with a good measuring section the variations of individual measurements from the mean curve should be comparatively small and as likely to be plus as minus. The probable error of a rating curve may be computed by the method of least squares and will be a factor in determining the probable error of the estimates of daily discharge.

Errors in determinations of daily discharge resulting from errors in the position of the rating curve will be cumulative for any stage, but may be partly compensating if the curve used lies first on one side and then on the other side of the true curve.

Refinement of gage readings.—Refinement of gage readings affects the accuracy of stream-flow data to a degree dependent on the sensitiveness of the station, which in turn is determined by the size and shape of the channel at the control in relation to the quantity of discharge. The sensitiveness is indicated by the magnitude of the change in stage accompanying a given change in discharge. The limiting requirements as to sensitiveness should be a change in stage, that is readable on the gage used for a change of 1 per cent in discharge. In general the more sensitive the station the more accurate the records that can be collected by ordinary methods and the less refinement necessary in the gage readings.

Errors due to lack of refinement in reading will generally be compensating, but they may be cumulative when the stage shows only small fluctuations during a considerable period or when they are due to systematic personal errors of the observer.

The degree of refinement in record of stage necessary to give a sufficiently accurate determination of discharge will vary inversely

with the stage and is determined by the sensitiveness of the station as disclosed by a study of the discharge rating curve.

Gages are usually read to hundredths, quarter-tenths, half-tenths, or tenths. The resulting absolute errors of observations in individual readings are shown by the following table:

Absolute errors for individual gage readings.

	Maximum error.	Average error.	
	Foot.	*Foot.*	*Fractional part of a tenth of a foot.*
Readings to hundredths	0.005	0.0025	$\frac{1}{40}$
Readings to quarter-tenths	.012	.006	$\frac{1}{16}$
Readings to half-tenths	.025	.012	$\frac{1}{8}$
Readings to tenths	.05	.025	$\frac{1}{4}$

For staff and chain gages 2 per cent has been selected, more or less arbitrarily, as the limit of allowable average error in a determination of daily discharge due to errors in the determination of mean daily gage height. The table indicates that the maximum error for any one day is twice the average error, so that the maximum error for any one day may be 4 per cent. According to the law of probabilities the average error in the determination of a monthly mean discharge for fluctuating stages resulting from a 2 per cent average error in the determination of mean daily discharge is about one-third of 1 per cent.

The refinement to which the records of mean daily gage height must be used—whether to hundredths, half-tenths, or tenths—in order to obtain this limit of accuracy in determinations of discharge at any given stage will depend on the percentage of difference in discharge for such least differences in gage readings at that stage, as shown by the rating table.

In determining this refinement the engineer should proceed as follows and enter the results in a table of the form given below, in which the Potomac at Point of Rocks, which is read once daily to hundredths, is used as an example.

Limits of accuracy in the use of gage readings.

Station.	Present readings.		Minimum gage height.	Minimum discharge.	Error in discharge due to error of 0.1 foot in the gage at minimum discharge.	Use gage heights to—		
	Number per day.	To—				Hundredths below—	Half-tenths between—	Tenths above—
Potomac River at Point of Rocks, Md	1	*Foot.* 0.01	*Feet.* 0.40	*Sec.-ft.* 580	*Per cent.* 36	*Feet.* 1.0	*Feet.* 1.0–2.0	*Feet.* 2.0

The discharge rating table shows that the minimum discharge is 580 second-feet and occurs at gage height 0.4 foot. The difference per tenth between gage heights 0.4 and 0.5 foot is 210 second-feet, or 36.2 per cent of the minimum discharge.

The limits of stage between which it is necessary to use mean daily gage heights to hundredths, half-tenths, and tenths, respectively, in order not to introduce an average error of over 2 per cent in the determination of daily discharge are shown in the last three columns and are determined by trial by testing values from the discharge rating table at selected half-foot intervals, as follows:

In testing at the 2-foot gage height for gage records to tenths the difference between the discharge at 2.0 feet and that at 2.1 feet is found to be 360 second-feet. The average error of a mean daily record to tenths is one-fourth tenth. Therefore at gage height 2.0 feet the average error for such record, expressed in second-feet, is $\frac{360}{4}=90$ second-feet, which is 1.8 per cent of 5,020 second-feet, the discharge at the 2-foot stage. Therefore it is not necessary to use gage-height records closer than 0.1 foot above the 2-foot stage, as above this stage the average error is less than 2 per cent, which is the allowable error.

A continuation of this analysis shows that in order to keep the error in the determination of discharge resulting from lack of refinement in gage readings below 2 per cent, the gage at Point of Rocks should be used to hundredths below the 1-foot stage, to half-tenths between 1.0 foot and 2.0 feet, and to tenths above 2.0 feet.

For a record obtained with a water-stage recorder the same procedure is followed except that the allowable error should be 1 per cent.

For stations with shifting control the methods of analysis above described can be used only in a general way.

In practice the limits of use of gage heights can be readily determined by the following rules:

Find the stage at which the difference in discharge per tenth is 8 per cent of the discharge at that stage. Gage heights above this stage should be used to tenths.

Find the stage at which the difference in discharge per tenth is 16 per cent of the discharge at that stage. Gage heights below this stage should be used to hundredths.

Gage heights between the two stages thus found should be used to half-tenths.

Frequency of gage readings.—The frequency of gage readings is an important factor in the accuracy of records of streams that are subject to considerable daily fluctuation in stage. To obtain a gage record so accurate that its use with the rating table will give the true mean discharge for the day the number of readings should vary, according to the nature of the fluctuations, from one or two daily to a continuous record obtained by some form of water-stage recorder.

To ascertain the frequency required it is necessary to compare the daily discharge obtained from one gage reading daily or the mean of two readings daily with that obtained from the mean of hourly gage heights or by a discharge integrator.

Errors due to insufficient gage readings may be cumulative or compensating, or alternately one and the other, according to the nature of the fluctuations in stage.

Methods of applying the daily gage heights to the rating table.—The method of applying daily gage heights to the rating table to ascertain mean daily discharge is determined by the curvature of the rating curve.

Theoretically, the mean daily discharge of a stream is the mean of the discharge for every second during the day. In ordinary computation of daily flow, it is assumed that the rate of discharge throughout the day varies so little or with such regularity that the daily discharge may be determined by entering a rating table with a mean daily gage height obtained either from a few observations or from a continuous record made by a water-stage recorder. As discharge is in general an increasing curvilinear function of gage height, the use of a mean daily gage height with a rating table gives a result that is always too small. The magnitude of this error, which will vary with the curvature of the rating curve and with the daily range in stage, will determine whether the daily discharge can be ascertained directly by finding a mean daily gage height or indirectly by averaging the discharge corresponding to gage heights for shorter intervals. Hourly discharge is frequently used. As an ultimate limit the absolute mean discharge for the day may be ascertained by a discharge integrator, which operates much as a planimeter operates and contains as an essential element the rating curve of the station. Such an integrator has been devised by E. S. Fuller, formerly assistant engineer, United States Geological Survey.

It is necessary, therefore, to study each gaging station, in order to determine the length of the period that should be used in applying the gage heights to the rating table. In such an investigation a maximum allowable error of 1 per cent is assumed. The amount of daily range in stage allowable for a given mean daily stage, in order that errors due to curvature of the rating curve shall not exceed 1 per cent, can be found graphically by constructing a chord to the rating curve such that the horizontal distance, measured by the discharge scale, from its middle point to the curve equals 1 per cent of the discharge at the gage height of the middle point. The difference in gage height at the ends of the chord will be the allowable daily range.

A table of such limits covering the range of stage, used with tables of mean daily stage and range in stage, will indicate the days for which the mean daily discharge can be found directly from the mean daily gage height and those for which more frequent intervals are necessary.

The errors resulting from the application of the gage height to the rating table will in general be cumulative, and their magnitude will vary with the method used in making the computations.

ACCURACY OF MONTHLY OR YEARLY MEANS.

The foregoing discussion of accuracy relates only to determinations of daily discharge. For many uses the mean flow for longer periods may be sufficient. The monthly mean is in general use for hydraulic studies. If errors resulting from all causes in the estimates of daily discharge are compensating, the probable error in the determination of mean monthly discharge will be much less than the probable error of the individual determinations of daily discharge. A careful analysis of the estimates of daily discharge and monthly means computed from them shows that large errors in the daily estimates may be so compensated that the errors in the monthly means are small.

ST. MARY RIVER BASIN.

GENERAL FEATURES.

St. Mary River rises in northwestern Montana, on the eastern slope of the Continental Divide (Pl. I), in a region of perpetual snow and ice. The stream flows out of the Blackfeet Glacier, probably the largest in the Rocky Mountains within the United States, and is joined by at least a dozen lesser streams that unite within a short distance of their sources. The combined waters flow into a lake which is hemmed in by lofty mountains and is known as Upper St. Mary Lake. A short stream through a narrow strip of land connects this lake with Lower St. Mary Lake, the total length of the two being 22 miles.

The river and all its tributaries except Boundary Creek on the west side and Rolph (Willow), Pinepound, and Pothole creeks on the east side rise in the main range of the Rocky Mountains, where the mean annual precipitation amounts to about 60 inches, and occurs in greater part as snow. Although comparatively small, this mountainous part of the basin furnishes practically all the water. The stream is subject to great fluctuation during the summer, furnishes water throughout the irrigation season, and maintains fairly constant though low flow during the winter.

Altitudes in the drainage basin in the United States range from 4,000 to 10,000 feet above sea level, and the fall of the river is comparatively rapid throughout its course, especially between the St. Mary Lakes and the Alberta Railway & Irrigation Co.'s intake. The elevation of the water level of the river at various points is shown by the following table:

Elevations and distances along St. Mary River.

Point on river.	Elevation above sea level.	Distances between points (approximate).	Fall between points.	Fall per mile.
	Feet.	*Miles.*	*Feet.*	*Feet.*
Outlet of Lower St. Mary Lake	4,460			
International boundary	4,103	13.5	357	26.4
North boundary T. 2, R. 24	3,680	19.0	423	22.3
North boundary T. 4, R. 24	3,435	25.0	245	9.8
East boundary T. 6, R. 23	2,969	34.0	466	13.7
Confluence with Belly River	2,705	32.0	264	8.3

In the upper part of the stream valley below St. Mary Lakes the banks on the west side of the river are, as a rule, gently sloping, but on the east side cut banks of clay and sandstone occur at a number of places as far down as the crossing of the United States Reclamation Service siphon west of Spider Lake, where a valley extends eastward into the drainage basin of Rolph or Willow Creek. Below this point, almost to the intake of the Alberta Railway & Irrigation Co.'s canal, the valley banks are high and in many places precipitous, especially through T. 1 in Canada, but from this point to about the center of T. 4 the valley is wider and the slope of the banks is much gentler From here on the stream flows for some distance in a deep, narrow canyon walled by almost perpendicular banks made up of clay with layers of sandstone. Below the canyon, though the valley is wider, there are numerous cut banks of clay and sandstone that effectually preclude the possibility of diversion for irrigation. If reasonable cost is a consideration, the diversion of water from this river for use on the bench lands at any point much below the south boundary of the Blood Indian Reserve appears to be impracticable.

From the St. Mary Lakes to the canyon in T. 4 the bed of the stream is composed of gravel and boulders and the banks are almost entirely of sand and gravel. A bed of gravel and boulders is, indeed, characteristic of the stream, although there is more rock and the boulders are larger in the lower reaches, where also the water is more turbid, probably because of material washed from the clay banks along this portion of its course.

In the upper part of the stream, where the grade is high, there are in places several channels separated by gravel banks, but lower down the stream appears to be confined to one channel and within well-defined banks.

The stream valley is practically unforested north of the mouth of Swiftcurrent Creek, and though aspen, willow, and poplar grow sparsely above this point, the growth is not sufficient to be commercially valuable.

The principal tributaries of the St. Mary are Swiftcurrent, Kennedy, and Lee creeks.

Swiftcurrent Creek rises near the Continental Divide and is fed by streams from Grinnell Glacier, Iceberg Lake, and several small, unnamed lakes. The first lake worthy of note is McDermott, which receives the drainage from an area comprising 31 square miles, practically all mountainous. The stream flowing from McDermott Lake passes by a fall and cataract about 80 feet high to the valley below, which spreads out to a width of about a mile and has comparatively little fall to the mouth of lower Sherburne Lake. A contraction of the valley at this point forms the site of the Sherburne Lake dam which, when completed, will back the water nearly to the foot of the McDermott falls. The only important tributary between McDermott Lake and the mouth of Sherburne Lake is Canyon Creek, the drainage area of which at the gaging station near the mouth comprises 7 square miles. Boulder Creek, the chief tributary of Swiftcurrent Creek, enters about 3 miles above the mouth. On October 1, 1915, Swiftcurrent Creek was diverted into Lower St. Mary Lake by a dam at the point where it leaves the mountains, about 2 miles above its former mouth.

Kennedy Creek, flowing into the St. Mary from the west, is in many respects similar to Swiftcurrent Creek, and although smaller, adds materially to the flow of the river. It rises in the mountains between the head of Swiftcurrent Creek and Chief Mountain. Its catchment area is small, but the run-off per square mile is large.

Lee Creek rises on the northern slope of Chief Mountain, crosses the international boundary some distance west of the St. Mary, and after flowing about 15 miles through Canadian territory joins the river east of Cardston. Its flow is large during the spring and early summer but decreases rapidly during the rest of the year, and through the winter months it carries little more than enough water to supply the domestic needs of the settlers along its banks and the municipal requirements of the town of Cardston.

The tributaries on the east side of the river—Rolph or Willow Creek, Pinepound Creek, and Pothole Creek—rising as they do in the foothills or on the Milk River Ridge, are unimportant and can not be depended on to supply even the domestic needs of the residents along them.

Boundary Creek, rising in the foothills between Lee Creek and St. Mary River and flowing in on the west side immediately south of the boundary, is similar in all respects to the creeks last mentioned.

A. ST. MARY RIVER NEAR BABB, MONT., LOOKING UPSTREAM.

B. GAGING STATION ON ST. MARY RIVER NEAR KIMBALL, ALBERTA, AT INTERNATIONAL BOUNDARY.

GAGING-STATION RECORDS.

STATIONS ON MAIN STREAM.

ST. MARY RIVER NEAR BABB, MONT.

LOCATION.—In Sec. 27, T. 36 N., R. 14 W., 1,040 feet above the headworks of St. Mary canal and about 2 miles south of Babb, on Blackfeet Indian Reservation, in Teton County. (See Pl. II, *A*.)

DRAINAGE AREA.—278 square miles, including area of Swiftcurrent Creek above point of diversion into Lower St. Mary Lake; prior to October 1, 1915, 177 square miles.

RECORDS AVAILABLE.—April 9, 1902, to December 31, 1917. Records subsequent to October 1, 1915, are comparable with those obtained at gaging station below mouth of Swiftcurrent Creek previous to that date. (See Regulation.)

GAGE.—Chain gage on right bank; a temporary low-water gage about 30 feet out in the stream is used during the winter months. Gages are read by employees of the United States Reclamation Service.

DISCHARGE MEASUREMENTS.—Made from a cable 560 feet below the gage or by wading about 800 feet below the gage. In September, 1909, the cable was moved from a point 300 feet downstream.

CHANNEL AND CONTROL.—Original stream channel practically permanent. Banks high and not subject to overflow. In 1916 construction work by the United States Reclamation Service on the St. Mary canal diversion dam, 1,040 feet below the gage, caused changes in the stage-discharge relation. This dam, which at present forms the principal control, is provided with flashboard sluice gates, but these are seldom changed. The St. Mary canal takes water from the left side of the dam. A gaging station is maintained at the head of the canal to determine the quantity of water diverted and discharge measurements show the effect of these diversions on the stage-discharge relation.

EXTREMES OF DISCHARGE.—Maximum stage during period covered by records estimated at 9.4 feet June 5, 1908 (discharge, 7,980 second-feet); minimum stage recorded, 1.0 foot April 3–7, 1904 (discharge, 20 second-feet).

ICE.—Stage-discharge relation may be affected by ice during January, February, and March, but the effect is usually small.

DIVERSIONS.—About 200 acres of hay land is irrigated by water diverted from Swiftcurrent Creek above this station.

REGULATION.—The flow of Swiftcurrent Creek, which is regulated to a small extent by Sherburne Lake reservoir, was diverted into St. Mary River October 1, 1915.

ACCURACY.—Stage-discharge relation affected by shifting of control at low water, by placing or removing flashboards on dam, and by diversions into the United States Reclamation Service St. Mary canal. The effect of these influences can be closely determined from the discharge measurements and the observer's notes. Records good.

Discharge measurements of St. Mary River near Babb, Mont., 1902–1917.

Date.	Made by—	Gage height.	Discharge.
1902.		*Feet.*	*Sec.-ft.*
Apr. 9	J. S. Baker	1.50	94
9	do	1.50	97
July 31	W. W. Schlecht	3.55	1,179
Aug. 5	W. B. Freeman	3.20	993
12	do	3.05	897
23	do	2.73	626
Sept. 2	do	2.47	487
22	C. T. Prall	2.00	355
29	W. B. Freeman	1.92	267
Oct. 8	do	1.85	232
24	A. M. Gilbert	1.73	205
30	C. T. Prall	1.65	182
1903.			
May 10	F. M. Brown	2.62	484
June 3	C. T. Prall	4.70	2,431
18	do	6.00	3,683
25	do	5.25	2,756
30	do	5.85	3,418
July 6	do	4.75	2,212
8	F. P. Sherburne	4.59	2,082
14	C. T. Prall	4.25	1,831
18	do	4.05	1,638
25	do	4.02	1,574
31	do	3.64	1,246
Aug. 8	do	3.14	909
14	do	3.05	841
22	do	2,97	801
27	do	2.92	758
Sept. 2	do	2.70	619
26	do	3.20	979
Oct. 3	do	3.22	995
10	do	2.65	637
17	do	2.70	664
1904.			
May 9	L. R. Stockman	3.13	878
June 8	W. B. Freeman	4.73	2,130
July 11	Robert Follansbee	4.30	1,771
29	W. B. Freeman	3.20	851
Aug. 31	do	2.42	441
Nov. 18	L. R. Stockman	1.25	62
1905.			
Apr. 26	Stockman and Morse	1.85	194
May 29	H. M. Morse	3.32	840
June 18	do	4.01	1,458
July 18	A. M. Crain	3.48	1,047
20	H. M. Morse	3.30	922
Aug. 11	A. M. Crain	2.92	666
Sept. 6	do	2.11	344
23	Morse and Freeman	1.98	233
Nov. 17	W. B. Freeman	1.85	172
1906.			
Mar. 31	Freeman and Edson	1.40	66
May 11	W. B. Freeman	2.92	631
Aug. 18	Morse and Hartman	2.82	629
Sept. 14	Richards and Hartman	2.42	420
1907.			
Mar. 20	W. S. Hanna	1.75	167
30	do	1.65	162
May 14	J. E. Stewart	3.05	691
June 5	J. B. Pierson	4.88	2,230
July 1	do	5.60	3,010
Aug. 7	do	3.58	1,120
Sept. 6	Follansbee and Pierson	3.11	761
1908.			
Apr. 17	A. F. Huch	1.85	171
June 19	do	4.84	3,140
July 25	Stewart and Huch	3.30	1,020
Aug. 21	do	2.17	525
22	do	2.17	501
Oct. 8	A. F. Huch	1.49	199
1909.		*Feet.*	*Sec.-ft.*
May 27	W. A. Lamb	2.98	938
June 13	do	4.42	2,440
July 6	do	4.40	2,210
7	do	4.39	2,250
Sept. 14	do	1.80	361
14	J. E. Stewart	1.80	356
18	W. A. Lamb	1.76	322
Oct. 13	do	1.50	235
1910.			
Apr. 19	W. A. Lamb	2.22	480
May 12	do	3.80	1,580
June 9	M. E. McChristie	3.62	1,400
23	W. A. Lamb	3.50	1,250
Aug. 1	M. E. McChristie	2.28	567
Sept. 16	do	1.42	204
Nov. 18	B. E. Jones	2.20	515
Dec. 30	do	1.06	94
1911.			
Mar. 14	W. A. Lamb	.93	79
May 3	B. E. Jones	2.25	515
7	do	2.80	797
June 5	do	4.22	1,840
23	W. A. Lamb	4.52	2,140
July 17	do	3.03	990
Aug. 25	B. E. Jones	2.06	443
Oct. 12	do	1.82	332
Dec. 8	do	1.00	86
1912.			
Mar. 16	W. A. Lamb	.68	49
July 2	R. R. Randell	3.53	1,330
Dec. 16	W. A. Lamb	1.16	117
1913.			
Mar. 30	W. A. Lamb	.94	86
June 10	R. R. Randell	5.40	2,980
Aug. 21	Lamb and Hoyt	2.43	604
Dec. 19	W. A. Lamb	.93	95
1914.			
Mar. 13	W. A. Lamb	.92	82
Dec. 16	B. E. Jones	1.27	162
1915.			
Feb. 18	W. A. Lamb	.77	66
June 23	do	3.17	1,100
July 18	B. E. Jones	2.71	808
Aug. 11	W. A. Lamb	2.36	602
1916.			
Jan. 24	W. A. Lamb	1.35	133
Apr. 25	do	2.18	472
May 23	do	3.55	1,340
June 10	A. H. Tuttle	4.92	2,410
24	Tuttle and Davis	6.05	4,660
25	do	5.70	4,100
July 17	W. A. Lamb	4.20	2,690
Aug. 16	do	2.39	1,030
Sept. 16	do	1.96	711
Nov. 23	do	.65	256
1917.			
Jan. 27	W. A. Lamb	−.55	85
Apr. 13	do	−.43	116
June 15	do	4.82	3,320
30	do	4,45	2,980
July 19	do	3.58	1,950
Aug. 16	do	1.75	630
Sept. 14	do	1.69	363
Nov. 9	Jones and Lamb	1.50	247

NOTE.—1906: May 11, meter probably not in good order; results low.
1907: Mar. 30, snowdrift in stream at left bank.
Dec. 30, 1910, and Mar. 14, 1911: Ice present at gage.
1912: Mar. 16, ice along both banks and at control, channel being open at control. Dec. 16, ice along bank at gage.
1914: Dec. 16, ice along banks, but control clear.
1915: Feb. 18, ice along shores, control clear; Apr. 20, flashboards placed in sluiceway, causing a rise of 1.5 feet in stage.

Daily discharge, in second-feet, of St. Mary River near Babb, Mont., 1902–1917.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1902.												
1	.....	.....	.....	120	190	3,760	1,750	1,160	515	258	190	127
2	.....	.....	.....	120	223	3,640	1,930	1,090	465	258	190	127
3	.....	.....	.....	120	295	3,640	2,390	1,020	465	258	190	127
4	.....	.....	.....	120	295	2,810	4,240	1,020	465	258	190	127
5	.....	.....	.....	120	295	2,490	4,360	950	420	223	158	127
6	.....	.....	.....	120	295	2,110	4,120	950	420	223	158	127
7	.....	.....	.....	120	295	1,660	3,640	880	420	223	158	.....
8	.....	.....	.....	120	295	1,660	3,400	880	420	223	158	.....
9	.....	.....	.....	127	375	1,840	3,040	880	375	223	158	.....
10	.....	.....	.....	127	375	1,840	2,700	880	375	223	158	.....
11	.....	.....	.....	127	375	1,930	2,490	740	335	223	158	.....
12	.....	.....	.....	127	375	1,840	2,490	810	335	223	158	.....
13	.....	.....	.....	127	375	1,840	2,110	810	335	223	158	.....
14	.....	.....	.....	127	420	1,660	2,110	810	335	223	158	.....
15	.....	.....	.....	158	810	1,930	1,750	810	295	223	158	.....
16	.....	.....	.....	158	950	1,840	1,750	810	335	223	158	.....
17	.....	.....	.....	158	1,840	1,750	1,750	740	335	223	158	.....
18	.....	.....	.....	158	1,840	1,570	1,660	740	295	223	158	.....
19	.....	.....	.....	158	2,200	1,570	1,660	740	295	223	158	.....
20	.....	.....	.....	127	3,160	1,570	1,570	740	295	223	158	.....
21	.....	.....	.....	127	3,640	1,395	1,570	740	295	223	158	.....
22	.....	.....	.....	158	3,640	1,235	1,570	675	295	223	158	.....
23	.....	.....	.....	190	3,640	1,160	1,480	675	295	223	158	.....
24	.....	.....	.....	223	4,000	950	1,570	620	295	223	158	.....
25	.....	.....	.....	223	3,760	950	1,570	620	258	223	127	.....
26	.....	.....	.....	158	3,640	1,375	1,660	620	258	190	127	190
27	.....	.....	.....	158	3,640	1,315	1,480	620	258	190	127	223
28	.....	.....	.....	158	2,490	1,570	1,480	620	258	190	127	190
29	.....	.....	.....	158	2,595	1,570	1,395	565	258	190	127	190
30	.....	.....	.....	190	3,640	1,395	1,235	565	258	190	127	158
31	.....	.....	.....	.....	3,640	.....	1,160	565	.....	190	.....	158
1903.												
1	158	72	72	72	223	2,110	3,280	1,160	740	1,090	465	295
2	158	72	72	98	223	2,110	3,040	1,160	675	1,020	465	335
3	158	72	50	98	258	2,200	2,810	1,160	675	950	465	335
4	127	72	50	98	258	2,390	2,490	1,090	620	880	420	335
5	127	72	50	98	295	2,920	2,200	1,020	620	880	420	335
6	127	72	50	98	375	3,520	2,110	950	620	810	420	335
7	98	72	50	98	465	3,400	2,110	950	620	740	375	335
8	98	72	50	98	515	3,520	2,020	880	565	675	375	335
9	98	72	50	98	565	3,520	2,020	880	565	620	375	335
10	98	72	50	98	565	3,520	1,930	880	515	565	375	295
11	98	72	50	98	515	3,400	1,840	950	515	565	420	295
12	98	72	50	98	515	3,520	1,840	950	515	620	420	295
13	98	72	50	98	565	3,520	1,840	880	515	620	375	295
14	98	72	50	98	565	3,520	1,750	810	515	620	375	295
15	98	72	50	98	620	3,520	1,750	810	465	620	375	295
16	72	72	50	98	675	3,400	1,750	810	465	620	375	295
17	72	72	50	98	675	3,520	1,660	740	465	620	375	295
18	72	72	50	98	675	3,520	1,570	810	465	620	375	295
19	72	72	50	98	620	3,640	1,570	810	465	565	375	295
20	72	72	50	127	675	3,520	1,570	810	465	565	375	295
21	72	72	50	127	620	3,400	1,570	810	515	515	375	295
22	72	72	50	158	740	3,160	1,480	740	515	565	375	295
23	72	72	50	158	810	3,160	1,480	740	565	565	335	295
24	72	72	72	190	950	2,920	1,480	740	565	565	335	295
25	72	72	72	223	1,090	2,810	1,480	740	620	515	335	295
26	72	72	72	223	1,160	2,700	1,480	740	950	515	335	295
27	72	72	72	223	1,160	2,700	1,480	740	1,090	515	335	295
28	72	72	72	223	1,395	2,920	1,395	740	1,090	515	335	295
29	72	.....	72	190	1,480	3,160	1,315	740	1,160	515	335	295
30	72	.....	72	190	1,660	3,400	1,315	740	1,160	515	295	295
31	72	.....	72	.....	2,110	.....	1,160	675	.....	465	.....	295

Daily discharge, in second-feet, of St. Mary River near Babb, Mont., 1902–1917—Contd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1904.												
1	.....	.....	.....	30	748	1,750	1,750	748	430	223	106	69
2	.....	.....	.....	30	812	1,750	1,750	748	430	233	106	55
3	.....	.....	.....	30	880	1,840	1,750	748	384	223	106	55
4	.....	.....	.....	30	880	1,840	1,840	748	578	223	106	55
5	.....	.....	.....	30	880	1,840	1,840	748	384	223	85	55
6	.....	.....	.....	30	880	1,930	1,840	748	384	223	85	55
7	.....	.....	.....	30	812	1,930	1,840	748	384	223	85	55
8	.....	.....	.....	42	812	2,020	1,840	748	384	223	85	55
9	.....	.....	.....	42	812	2,110	1,840	748	384	223	85	55
10	.....	.....	.....	42	812	2,110	1,840	748	384	189	69	55
11	223	.....	.....	42	812	2,110	1,840	748	384	189	69	55
12	223	.....	.....	55	748	2,020	1,750	748	340	189	69	55
13	223	.....	.....	55	748	1,840	1,750	748	340	189	69	55
14	190	.....	.....	69	748	1,660	1,750	748	340	189	69	55
15	190	.....	.....	69	812	1,750	1,750	688	340	189	69	55
16	158	.....	.....	85	812	1,840	1,570	688	298	189	69	55
17	127	.....	.....	85	812	1,840	1,400	631	298	189	69	55
18	127	.....	.....	85	880	2,020	1,240	631	298	189	69	55
19	127	.....	.....	85	950	2,020	1,160	578	298	189	69	55
20	.....	.....	.....	189	1,020	2,200	1,090	631	298	159	85	55
21	.....	.....	.....	298	1,160	2,300	950	631	298	159	106	55
22	.....	.....	.....	430	1,480	2,200	880	631	298	159	106	55
23	.....	.....	.....	478	1,660	2,200	880	578	259	159	106	55
24	.....	.....	.....	478	1,840	2,110	812	578	223	131	85	55
25	.....	.....	.....	478	2,020	2,110	812	527	223	106	69	55
26	.....	.....	.....	478	2,020	1,930	812	478	223	106	69	55
27	.....	.....	.....	527	1,840	1,660	812	430	223	106	69	55
28	.....	.....	.....	527	1,750	1,660	812	430	223	106	69	55
29	.....	.....	.....	578	1,660	1,660	880	384	223	106	69	55
30	.....	.....	.....	688	1,660	1,660	812	384	223	106	69	55
31	.....	.....	.....	.....	1,750	.....	748	430	.....	106	.....	55
1905.												
1	.....	.....	69	159	384	995	995	855	325	210	285	.....
2	.....	.....	69	159	430	1,145	995	790	325	245	285	.....
3	.....	.....	69	159	430	1,460	995	790	325	245	245	.....
4	.....	.....	69	159	430	1,545	995	790	325	285	245	.....
5	.....	.....	69	131	430	1,715	995	725	325	365	245	.....
6	.....	.....	69	131	430	1,890	1,070	725	325	455	245	.....
7	.....	.....	69	131	430	1,890	1,070	725	325	555	245	.....
8	.....	.....	69	131	478	1,890	1,070	725	285	555	245	.....
9	.....	.....	69	131	478	1,890	1,145	665	285	555	210	.....
10	.....	.....	69	131	527	1,890	1,145	665	285	610	210	.....
11	.....	.....	69	131	527	1,800	1,220	665	285	665	210	.....
12	.....	.....	69	131	527	1,800	1,220	665	285	665	210	.....
13	.....	.....	69	131	578	1,800	1,220	665	285	610	210	.....
14	.....	.....	69	131	578	1,800	1,145	610	285	610	210	.....
15	.....	.....	85	131	578	1,800	1,145	610	285	555	210	.....
16	.....	.....	85	159	578	1,800	1,070	610	245	555	175	.....
17	.....	.....	85	159	578	1,890	995	610	245	505	175	.....
18	.....	.....	106	159	578	1,400	1,070	555	245	505	175	.....
19	.....	.....	106	159	578	1,300	1,070	505	245	455	175	.....
20	.....	.....	106	131	578	1,220	995	505	245	455	175	.....
21	.....	.....	106	131	748	1,220	995	505	245	410	175	.....
22	.....	.....	131	131	812	1,300	925	505	245	410	175	.....
23	.....	.....	131	131	880	1,145	925	410	245	365	175	.....
24	.....	.....	131	159	880	1,070	925	410	245	325	175	.....
25	.....	.....	131	223	950	1,070	925	410	210	285	175	.....
26	.....	.....	131	259	950	995	855	410	210	285	175	.....
27	.....	.....	131	259	950	995	855	410	210	285	175	.....
28	.....	.....	131	340	950	995	855	365	210	285	175	.....
29	.....	.....	159	430	950	925	855	365	245	285	175	.....
30	.....	.....	159	384	950	925	855	325	245	285	175	.....
31	.....	.....	159	.....	950	.....	855	325	.....	285	.....	.....

Daily discharge, in second-feet, of St. Mary River near Babb, Mont., 1902–1917—Contd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1906.												
1	.....	.....	65	90	610	925	1,220	725	610	325	725	555
2	.....	.....	65	90	610	925	1,220	725	610	285	790	505
3	.....	.....	65	90	665	1,070	1,220	665	610	325	790	505
4	.....	.....	65	90	665	1,145	1,220	665	610	285	790	455
5	.....	.....	65	115	665	1,220	1,300	665	555	325	725	455
6	.....	.....	90	115	665	1,300	1,300	665	555	285	665	410
7	.....	.....	90	115	665	1,300	1,380	610	555	325	610	410
8	.....	.....	90	115	665	1,380	1,380	610	555	285	665	410
9	.....	.....	90	115	665	1,380	1,460	610	555	365	555	365
10	.....	.....	90	115	725	1,380	1,460	610	505	325	555	325
11	.....	.....	90	115	725	1,380	1,545	555	505	365	610	245
12	.....	.....	90	115	725	1,380	1,545	555	455	325	610	245
13	.....	.....	90	145	790	1,460	1,630	555	455	365	665	245
14	.....	.....	90	145	925	1,545	1,545	555	410	325	665	245
15	.....	.....	90	145	995	1,630	1,545	555	410	410	725	245
16	.....	.....	90	145	1,145	1,715	1,460	555	410	365	725	245
17	.....	.....	90	145	1,070	1,460	1,380	610	410	410	790	245
18	.....	.....	90	145	1,070	1,460	1,300	610	365	410	725	210
19	.....	.....	90	175	995	1,460	1,220	610	365	455	725	210
20	.....	.....	90	175	995	1,380	1,145	665	365	410	725	210
21	.....	.....	90	210	925	1,380	1,070	665	325	505	665	210
22	.....	.....	90	245	925	1,300	1,070	725	325	455	665	210
23	.....	.....	90	285	925	1,220	995	725	325	505	665	210
24	.....	.....	90	325	855	1,220	995	725	325	505	665	175
25	.....	.....	90	365	855	1,145	925	790	325	555	610	175
26	.....	.....	90	455	925	1,145	855	725	325	505	610	175
27	.....	.....	90	505	925	1,070	855	725	285	555	610	175
28	.....	.....	65	555	925	1,145	790	725	285	555	555	175
29	.....	.....	65	555	925	1,145	790	665	285	610	555	175
30	.....	.....	65	555	925	1,220	925	665	285	610	555	175
31	.....	.....	65	.....	925	.....	925	610	.....	725	.....	175
1907.												
1	.....	.....	.....	142	388	1,370	2,980	1,290	905	532	202	90
2	.....	.....	.....	142	388	1,455	2,870	1,290	835	532	202	90
3	.....	.....	.....	142	388	1,625	2,870	1,210	835	532	202	90
4	.....	.....	.....	142	388	1,890	2,870	1,210	835	532	171	90
5	.....	.....	.....	142	388	2,070	2,870	1,130	765	481	171	90
6	.....	.....	.....	142	388	2,255	2,870	1,130	765	433	171	90
7	.....	.....	.....	142	433	2,450	2,760	1,130	765	433	171	90
8	.....	.....	.....	142	433	2,450	2,650	1,055	765	433	171	90
9	.....	.....	.....	142	433	2,350	2,550	1,000	765	433	142	90
10	.....	.....	.....	171	433	2,160	2,550	980	700	388	142	90
11	.....	.....	.....	171	433	2,160	2,450	905	765	388	142	90
12	.....	.....	.....	171	481	2,160	2,350	905	835	346	142	90
13	.....	.....	.....	171	640	2,255	2,160	905	835	346	142	90
14	.....	.....	.....	202	700	2,255	2,160	835	700	346	142	90
15	.....	.....	.....	202	835	2,255	2,070	835	640	346	142	90
16	.....	.....	.....	202	1,210	2,350	2,070	835	640	346	115	90
17	.....	.....	.....	235	1,455	2,350	1,980	765	640	307	115	47
18	.....	.....	.....	235	1,710	2,450	1,890	765	640	307	115	47
19	.....	.....	.....	235	1,710	2,450	1,800	700	585	307	115	47
20	.....	.....	.....	270	1,710	2,550	1,710	700	585	270	115	47
21	.....	.....	.....	270	1,625	2,550	1,710	700	585	270	115	47
22	.....	.....	.....	307	1,625	2,650	1,625	700	585	270	115	47
23	.....	.....	.....	307	1,625	2,650	1,625	765	585	270	115	47
24	.....	.....	.....	346	1,540	2,760	1,540	765	532	235	115	47
25	.....	.....	.....	346	1,540	2,760	1,540	640	765	235	115	67
26	.....	.....	.....	346	1,455	2,760	1,455	640	640	235	115	67
27	.....	.....	.....	388	1,455	2,870	1,455	640	585	235	90	67
28	.....	.....	.....	388	1,455	2,870	1,455	765	585	235	90	67
29	.....	.....	.....	388	1,455	2,980	1,370	765	585	202	90	67
30	.....	.....	.....	388	1,370	2,980	1,370	835	585	202	90	67
31	.....	.....	.....	.....	1,370	.....	1,290	905	.....	202	.....	90

Daily discharge, in second-feet, of St. Mary River near Babb, Mont., 1902–1917—Contd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1				171	1,130	1,670	1,380	800	372	247	247	
2				171	1,060	1,940	1,380	770	350	247	247	
3				171	1,060	2,020	1,460	740	328	247	247	
4				171	1,130	5,000	1,500	740	286	229	247	
5				171	980	7,980	1,630	710	286	211	247	
6				179	835	7,740	1,680	680	286	211	247	
7				187	905	7,620	1,630	652	286	211	229	
8				195	1,060	6,420	1,540	623	286	208	229	
9				202	1,250	5,750	1,540	596	286	208	211	
10				213	1,370	4,910	1,580	568	286	211	211	
11				224	1,540	4,490	1,580	568	286	211	211	
12				235	1,670	4,250	1,580	596	286	229	211	
13				235	1,620	3,830	1,540	568	286	229	211	
14				203	1,670	3,490	1,630	568	286	247	211	
15				171	1,670	3,270	1,580	542	286	286	229	
16				179	1,670	3,160	1,680	516	286	307	229	
17				186	1,620	3,050	1,540	491	286	307	211	
18				226	1,500	2,880	1,540	466	307	307	211	
19				266	1,370	2,610	1,460	466	350	307	194	
20				307	1,330	2,450	1,340	466	328	328	178	
21				719	1,250	2,250	1,300	442	328	328	178	
22				1,130	1,170	2,000	1,260	442	328	307	211	
23				1,080	1,170	1,760	1,260	491	286	286	211	
24				1,030	1,130	1,680	1,260	466	307	286	211	
25				980	1,170	1,580	1,220	466	307	286	211	
26				980	1,210	1,760	1,140	466	307	286	211	
27				980	1,370	1,680	1,070	466	307	286	211	
28				1,130	1,370	1,630	1,000	466	286	286	211	
29				1,060	1,330	1,580	930	466	266	286	175	
30				1,060	1,370	1,460	865	466	266	286	125	
31					1,460		832	418		266		
1909.												
1					161	1,960	1,760	1,130	538	252	161	
2					161	2,460	1,860	1,100	582	252	161	
3					161	3,100	2,080	1,070	605	252	235	
4					161	3,520	2,180	1,040	582	252	326	
5					161	3,700	2,080	1,010	560	252	366	
6					161	2,980	2,180	979	538	252	515	
7					174	2,980	2,180	948	538	252	493	
8					188	2,740	2,040	917	582	244	471	
9					252	2,740	1,910	886	582	235	366	
10					252	2,460	1,910	855	493	244	407	
11					235	2,240	1,760	825	366	252	450	
12					252	2,180	1,510	825	366	244	428	
13					270	2,260	1,420	795	366	235	346	
14					326	2,350	1,280	738	366	235	366	
15					326	2,520	1,200	765	366	235	386	
16					346	2,520	1,200	738	326	219	346	
17					366	2,080	1,160	710	326	219	450	
18					450	1,860	1,130	710	307	203	443	
19					450	3,640	855	682	288	203	436	
20					471	3,700	765	710	288	203	429	
21					493	3,900	682	630	288	188	421	
22					682	3,460	538	655	279	203	414	
23					560	3,100	450	630	270	188	407	
24					605	2,920	407	630	261	188	428	
25					605	2,300	450	605	252	188	450	
26					795	2,130	682	605	252	181	450	
27					918	2,080	795	582	252	174	450	
28				136	950	2,300	885	582	252	188	450	
29				136	985	1,960	1,200	538	252	174	450	
30				136	985	1,860	1,240	538	252	161	471	
31					1,960		1,160	582		161		

Daily discharge, in second-feet, of St. Mary River near Babb, Mont., 1902–1917—Contd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1910.												
1	.....	.....	.....	295	1,290	1,600	1,100	525	230	330	500	260
2	.....	.....	.....	295	1,210	1,660	1,060	500	230	410	500	260
3	.....	.....	.....	295	1,130	1,710	1,060	500	230	410	500	230
4	.....	.....	.....	260	1,030	1,660	1,060	450	230	410	450	260
5	.....	.....	.....	230	935	1,510	1,030	450	230	500	450	260
6	.....	.....	.....	230	935	1,380	995	430	230	650	410	260
7	.....	.....	.....	230	935	1,340	935	430	230	550	410	230
8	.....	.....	.....	260	1,030	1,470	905	410	230	700	410	230
9	.....	.....	.....	260	1,210	1,380	875	410	230	755	410	230
10	.....	.....	.....	330	1,420	1,380	845	410	215	755	410	230
11	.....	.....	.....	295	1,560	1,380	815	410	215	815	410	230
12	.....	.....	.....	330	1,560	1,380	785	402	215	875	450	230
13	.....	.....	143	350	1,470	1,420	785	390	215	875	450	230
14	.....	.....	143	370	1,420	1,380	755	370	215	815	450	230
15	.....	.....	143	410	1,420	1,380	755	370	215	755	500	230
16	.....	.....	143	430	1,340	1,470	755	370	215	700	500	200
17	.....	.....	143	450	1,210	1,510	755	370	230	650	500	170
18	.....	.....	143	450	1,060	1,560	755	330	230	600	500	170
19	.....	.....	143	475	1,100	1,560	728	330	230	550	500	170
20	.....	.....	170	550	1,060	1,510	728	330	260	550	550	170
21	.....	.....	143	575	995	1,420	845	330	260	500	450	170
22	.....	.....	170	625	995	1,380	700	295	260	450	450	170
23	.....	.....	200	675	995	1,250	700	295	295	410	410	170
24	.....	.....	200	728	995	1,130	700	330	330	410	410	170
25	.....	.....	230	755	1,170	1,060	675	295	330	410	370	140
26	.....	.....	230	845	1,340	1,060	600	295	330	450	370	140
27	.....	.....	260	935	1,510	1,060	600	260	330	500	350	140
28	.....	.....	260	1,100	1,560	1,060	600	260	330	450	350	120
29	.....	.....	295	1,250	1,560	1,100	575	260	330	550	330	100
30	.....	.....	330	1,290	1,600	1,100	550	230	330	500	295	100
31	.....	.....	295	.....	1,660	.....	550	230	.....	500	.....	75
1911.												
1	22	.....	.....	80	500	815	1,520	675	370	550	182	90
2	33	.....	.....	80	500	1,130	1,440	650	370	525	182	90
3	62	.....	.....	102	500	1,200	1,200	650	370	525	167	90
4	46	.....	80	102	550	1,680	1,280	600	500	500	167	90
5	46	.....	102	102	600	1,920	1,280	550	550	500	167	90
6	46	.....	102	102	650	2,010	1,280	550	650	475	167	90
7	46	.....	80	102	815	1,920	1,280	575	650	450	167	90
8	62	80	80	102	905	1,840	1,200	600	625	410	139	90
9	80	80	80	102	935	1,840	1,130	600	600	390	139	90
10	.....	62	80	102	995	1,840	1,060	600	600	350	113	62
11	.....	62	80	102	1,060	1,840	995	600	625	330	113	62
12	.....	62	80	102	995	1,920	895	575	625	330	90	53
13	.....	46	80	102	995	2,190	935	550	650	330	70	53
14	.....	46	80	102	995	2,280	935	550	650	312	70	53
15	.....	46	62	102	1,060	2,370	935	550	650	312	70	46
16	.....	62	62	102	1,360	2,460	935	525	650	295	90	39
17	.....	80	62	126	1,440	2,370	935	525	650	295	113	33
18	.....	80	62	126	1,440	2,370	935	500	650	295	139	33
19	.....	.....	62	126	1,440	2,370	935	500	650	278	139	33
20	.....	.....	62	126	1,360	2,280	935	500	625	262	139	33
21	.....	.....	62	153	1,360	2,010	905	500	625	262	153	33
22	.....	.....	62	153	1,280	2,190	875	475	600	246	139	33
23	.....	.....	62	182	1,130	2,190	815	475	625	229	139	33
24	.....	.....	80	213	1,130	2,280	815	450	650	229	139	33
25	.....	.....	80	213	1,060	2,190	815	450	675	229	139	33
26	.....	.....	80	213	1,060	2,100	785	450	650	229	139	33
27	.....	.....	80	278	1,060	1,920	755	450	650	229	113	33
28	.....	.....	80	350	995	1,760	728	475	625	229	113	33
29	.....	.....	80	390	875	1,680	700	450	600	229	90	33
30	.....	.....	80	390	815	1,680	700	410	575	213	90	33
31	.....	.....	80	.....	755	.....	700	390	.....	182	.....	33

Daily discharge, in second-feet, of St. Mary River near Babb, Mont., 1902–1917—Contd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1912.												
1	38	73	57	57	253	1,360	1,360	755	366	225	225	195
2	42	73	57	57	290	1,360	1,360	700	366	195	241	166
3	46	73	57	59	328	1,360	1,280	700	347	195	225	166
4	50	69	57	59	366	1,360	1,200	700	366	180	225	180
5	54	69	57	63	366	1,280	1,200	700	328	195	225	166
6	59	66	57	67	366	1,200	1,130	700	347	195	225	166
7	59	66	57	73	386	1,200	1,130	700	328	180	225	166
8	59	63	57	73	405	1,200	1,060	700	347	195	210	152
9	59	59	57	76	445	1,200	995	700	347	195	225	166
10	59	59	53	81	445	1,280	935	645	347	166	210	166
11	59	59	53	98	490	1,360	935	645	366	180	210	139
12	59	59	49	107	540	1,520	875	618	347	166	225	139
13	66	57	49	118	645	1,520	815	618	366	180	225	139
14	73	57	47	102	700	1,520	815	590	366	166	257	139
15	73	57	47	107	935	1,520	815	565	328	195	241	128
16	73	57	45	153	1,060	1,520	815	540	347	195	241	139
17	73	57	45	159	1,200	1,440	755	540	347	195	257	139
18	73	57	45	177	1,360	1,360	755	515	328	195	241	139
19	73	57	45	190	1,440	1,360	755	490	328	225	257	128
20	73	57	45	210	1,520	1,360	700	490	309	225	257	128
21	73	57	45	217	1,680	1,360	700	490	328	241	225	116
22	73	57	45	217	1,680	1,360	755	445	290	225	225	116
23	73	57	45	253	1,680	1,360	815	445	290	257	225	116
24	73	57	45	253	1,600	1,360	815	445	290	241	225	116
25	73	57	45	272	1,520	1,360	815	445	253	257	210	116
26	73	57	47	290	1,520	1,360	875	445	272	241	225	106
27	73	57	47	290	1,520	1,360	875	445	253	225	195	96
28	73	57	47	290	1,440	1,360	815	405	253	257	195	96
29	73	57	49	309	1,440	1,360	815	405	235	241	195	96
30	73	.....	49	272	1,360	1,360	815	405	235	257	180	88
31	73	.....	49	.....	1,360	.....	755	386	.....	241	.....	88
1913.												
1	79	72	88	40	385	3,080	2,280	815	645	232	218	.....
2	79	72	88	40	425	3,380	2,100	815	645	232	218	.....
3	72	72	88	31	468	3,380	2,010	755	618	218	232	.....
4	72	72	88	31	405	3,480	1,840	755	645	232	232	.....
5	72	79	88	31	445	3,480	1,760	755	618	232	232	.....
6	72	.....	96	36	468	3,380	1,600	755	618	232	232	.....
7	72	.....	96	40	468	3,180	1,600	815	522	232	232	.....
8	72	.....	116	51	468	3,080	1,520	815	425	218	232	.....
9	64	.....	116	64	468	3,080	1,520	755	405	232	232	.....
10	64	.....	116	79	405	2,980	1,440	700	386	232	232	.....
11	64	.....	116	106	425	2,980	1,440	645	425	218	232	.....
12	64	.....	116	128	425	2,980	1,440	700	367	218	232	.....
13	64	.....	139	139	468	2,880	1,360	700	367	218	232	.....
14	72	.....	139	152	490	2,780	1,200	645	349	218	232	.....
15	72	.....	139	210	540	2,680	1,200	700	331	218	218	.....
16	72	.....	139	225	565	2,480	1,060	700	349	203	218	.....
17	64	.....	139	241	618	2,190	1,060	645	331	203	203	.....
18	64	.....	152	274	700	2,100	995	700	331	203	190	.....
19	64	.....	152	309	700	1,920	875	645	331	218	190	.....
20	72	.....	152	346	700	1,840	875	645	331	218	190	90
21	72	79	139	309	700	1,840	815	645	314	232	203	90
22	72	79	116	309	700	1,760	815	618	296	218	176	82
23	64	79	116	274	700	1,840	815	618	280	218	176	82
24	64	79	116	274	755	1,760	875	645	280	218	176	82
25	64	79	96	274	815	1,760	875	618	280	218	176	74
26	64	88	79	274	1,200	1,840	875	645	263	218	176	74
27	64	88	64	309	1,600	1,920	875	618	232	218	176	74
28	64	88	51	309	2,190	2,010	875	645	232	232	176	67
29	72	.....	51	327	2,680	2,100	875	618	232	232	176	67
30	72	.....	46	365	2,980	2,100	875	618	232	232	176	60
31	72	.....	40	.....	3,080	.....	875	590	.....	218	.....	60

Daily discharge, in second-feet, of St. Mary River near Babb, Mont., 1902-1917—Contd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1914.												
1	62	64	90	108	590	1,280	995	540	367	405	396	215
2	64	67	90	108	590	1,360	995	540	349	386	386	215
3	67	67	90	108	645	1,520	995	540	314	406	386	184
4	62	67	90	108	755	1,680	1,030	540	331	426	425	184
5	57	67	90	108	875	1,680	1,060	490	314	445	425	170
6	52	67	90	108	935	1,760	1,060	515	296	425	490	215
7	48	67	90	108	935	1,680	1,200	490	296	445	515	199
8	50	67	90	108	935	1,520	1,130	490	296	405	515	199
9	52	67	90	108	875	1,360	1,200	445	296	425	515	191
10	53	67	90	108	935	1,130	1,060	405	280	386	468	184
11	54	67	90	108	935	1,060	1,130	445	296	405	490	177
12	55	69	90	108	995	935	1,060	425	248	377	490	170
13	56	71	90	128	1,060	995	1,060	405	248	349	468	164
14	58	72	90	128	1,060	1,060	1,060	405	248	367	445	157
15	60	74	90	151	1,130	1,060	935	405	263	349	425	157
16	62	74	92	151	1,200	1,260	935	405	263	367	425	170
17	64	82	94	176	1,280	1,280	935	405	263	405	405	179
18	66	82	96	176	1,440	1,360	875	405	248	425	386	189
19	67	82	99	203	1,520	1,440	845	405	263	490	386	199
20	67	82	99	263	1,440	1,520	815	445	288	515	349	184
21	67	82	99	296	1,600	1,520	700	425	314	540	368	199
22	67	84	99	296	1,520	1,440	700	425	332	540	386	199
23	67	86	99	367	1,520	1,360	700	405	349	515	367	170
24	67	88	99	405	1,520	1,210	700	425	367	540	349	184
25	67	90	99	405	1,440	1,060	590	405	387	515	331	164
26	67	90	99	405	1,520	995	590	405	406	490	297	144
27	67	90	99	445	1,600	1,060	590	405	425	445	263	128
28	67	90	99	540	1,440	1,030	590	367	445	425	248	111
29	60	.....	99	540	1,360	995	540	367	425	405	233	119
30	60	.....	99	590	1,200	935	490	367	405	386	218	119
31	62	.....	99	.....	1,280	.....	540	367	.....	405	.....	119
1915.												
1	114	83	64	76	600	854	1,260	680	365	386	490	304
2	109	82	62	76	680	854	1,260	680	476	430	450	266
3	101	81	60	76	794	916	1,330	653	524	524	440	266
4	96	80	57	79	794	980	1,260	653	574	626	430	266
5	92	80	58	83	854	1,050	1,260	653	524	653	430	248
6	86	80	59	87	854	1,110	1,180	653	500	653	420	231
7	81	80	59	91	794	1,110	1,180	626	524	653	440	231
8	78	78	59	100	794	1,110	1,110	626	476	600	420	231
9	74	77	59	109	794	1,110	1,110	600	476	574	460	248
10	77	77	55	115	916	1,110	1,050	600	453	574	530	266
11	80	77	55	122	1,050	1,050	1,050	600	430	549	476	266
12	80	76	56	128	1,050	980	980	600	430	524	453	248
13	80	76	56	140	1,110	980	916	574	386	524	430	231
14	70	74	56	152	1,110	916	916	574	430	500	408	215
15	59	71	55	161	1,110	916	854	574	365	476	408	199
16	59	70	55	170	1,110	916	794	549	324	476	430	199
17	59	69	55	190	1,050	916	794	549	304	476	430	184
18	62	66	56	219	980	1,050	794	549	304	476	430	184
19	66	66	56	248	916	1,110	736	524	344	476	430	184
20	74	66	56	286	854	1,110	736	524	344	476	386	.....
21	78	66	56	324	794	1,110	680	524	365	453	408	.....
22	80	65	57	386	794	1,110	653	524	386	430	344	.....
23	83	66	57	430	736	1,110	653	500	365	430	365	.....
24	84	66	57	476	736	1,050	680	500	365	430	344	.....
25	84	66	66	500	736	1,110	653	500	344	453	344	.....
26	84	65	66	500	736	1,180	736	476	344	453	344	.....
27	86	65	67	476	736	1,260	736	476	365	453	344	.....
28	86	64	68	476	736	1,260	736	453	344	430	344	.....
29	84	.....	68	500	736	1,260	736	453	365	430	324	.....
30	83	.....	69	524	736	1,260	736	408	344	430	304	.....
31	83	.....	72	.....	794	.....	680	408	.....	430	.....	.....

Daily discharge, in second-feet, of St. Mary River near Babb, Mont., 1902-1917—Contd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1916.												
1	.....	135	168	447	640	1,270	4,540	1,230	877	462	177	154
2	.....	135	168	424	923	1,270	4,210	1,230	877	462	183	150
3	.....	135	168	400	802	1,270	4,320	1,160	1,230	444	183	171
4	.....	135	168	400	923	1,270	4,540	1,160	1,310	426	227	159
5	.....	135	168	400	988	1,340	4,320	1,080	1,480	409	171	150
6	.....	135	168	376	1,060	1,800	4,100	1,080	1,570	392	171	146
7	.....	135	168	376	1,490	1,880	3,770	1,080	1,570	360	171	143
8	.....	135	250	376	1,800	2,040	3,660	1,160	1,570	330	171	140
9	.....	135	331	447	2,130	2,310	3,660	1,160	1,570	301	211	139
10	.....	135	342	447	1,860	2,480	3,550	1,160	1,400	287	196	138
11	.....	152	353	447	1,800	2,650	3,550	1,230	1,160	236	183	138
12	.....	168	364	470	1,720	2,740	3,660	1,230	1,010	245	183	137
13	.....	168	376	470	1,720	2,650	3,660	1,160	877	265	183	137
14	.....	168	376	470	1,490	2,740	3,230	1,160	818	245	183	136
15	.....	168	376	470	1,270	2,830	2,810	1,160	763	255	171	136
16	.....	168	376	494	1,130	3,290	2,600	1,080	763	265	227	135
17	.....	168	376	494	1,060	3,760	2,600	1,010	763	245	337	135
18	.....	168	376	518	1,060	4,760	2,500	1,010	663	255	352	134
19	135	168	376	542	1,060	5,160	2,500	1,010	663	311	287	134
20	135	168	400	566	988	5,360	2,220	1,010	618	337	245	133
21	135	168	424	566	988	5,560	2,020	1,010	618	471	245	133
22	135	168	424	615	1,060	5,260	1,920	940	618	452	245	132
23	135	168	424	566	1,200	4,760	1,920	877	618	366	255	132
24	135	168	447	590	1,060	4,760	1,740	877	536	287	219	131
25	135	168	454	518	1,130	4,210	1,740	877	536	245	236	131
26	135	168	462	542	1,340	4,100	1,570	877	536	190	190	130
27	135	168	470	542	1,340	3,990	1,570	877	498	171	171	130
28	135	168	470	542	1,340	4,100	1,480	877	498	180	171	127
29	135	168	470	494	1,340	4,320	1,480	877	498	190	165	125
30	135	.....	470	542	1,270	4,650	1,400	877	498	177	154	122
31	135	.....	470	.....	1,270	.....	1,310	877	.....	190	.....	110
1917.												
1	108	89	81	66	205	2,840	2,770	1,010	511	328	222	120
2	106	89	81	70	205	2,840	2,720	932	507	328	246	120
3	103	89	81	73	205	2,620	2,690	860	467	328	246	120
4	102	89	81	73	205	2,620	2,730	849	463	328	246	120
5	100	81	81	73	205	2,510	2,800	778	463	358	257	120
6	97	81	81	79	205	2,510	2,840	750	433	358	272	120
7	97	73	81	86	205	2,510	2,880	750	430	358	257	120
8	97	73	81	93	250	2,950	2,840	750	398	371	246	120
9	97	70	81	100	300	3,500	2,740	750	398	371	246	88
10	89	70	81	107	415	3,940	2,690	750	388	371	246	66
11	97	73	81	114	620	4,160	2,550	740	377	371	246	66
12	97	73	81	114	770	4,160	2,580	700	366	358	246	66
13	97	77	81	119	1,020	3,830	2,510	675	355	358	246	74
14	97	81	81	119	1,460	3,500	2,390	655	385	328	208	88
15	97	81	81	124	1,760	3,280	2,200	650	385	299	208	104
16	97	81	81	128	2,400	3,390	1,940	650	385	299	199	104
17	97	81	81	128	2,620	3,610	1,860	650	385	299	178	104
18	97	81	81	128	2,620	3,880	1,860	650	367	299	178	120
19	89	81	81	133	2,620	3,940	1,960	650	367	299	178	120
20	89	81	81	125	2,620	4,000	1,960	650	355	299	178	127
21	89	81	81	125	2,510	3,940	1,900	660	355	288	165	127
22	89	81	81	165	2,510	3,940	1,840	675	355	272	157	138
23	89	81	81	165	2,180	3,830	1,740	700	355	272	150	138
24	89	81	81	165	2,070	3,660	1,560	690	355	246	138	138
25	89	81	81	165	2,180	3,610	1,460	655	355	222	138	138
26	85	81	81	165	2,620	3,500	1,340	645	355	222	138	138
27	85	81	81	205	2,950	3,390	1,280	630	355	199	138	138
28	89	81	73	205	3,060	3,220	1,250	605	355	199	138	138
29	89	.....	73	205	3,280	3,060	1,250	563	355	199	127	150
30	89	.....	73	205	3,280	2,900	1,170	520	355	199	127	157
31	89	.....	73	.....	3,170	.....	1,220	520	.....	199	.....	157

NOTE.—Mean discharge for January, February, March, and December, 1908, has been revised, as observer read the gage in inches. Channel open part of February and March; determinations good. For January the record is fair. Discharge Apr. 1-8, 1902, estimated.

Stage-discharge relation affected by ice and discharge estimated for following periods: Jan. 1 to Mar. 31 and Dec. 1-31, 1902; Dec. 11-31, 1903; Jan. 1-10 and Jan. 20 to Apr. 2, 1904; Jan. 1 to Mar. 1 and Nov. 26 to Dec. 31, 1905; Jan. 1 to Feb. 19 and Mar. 11-25, 1906; Jan. 1 to Mar. 31, 1907; Jan. 1 to Mar. 31 and Nov. 29

to Dec. 31, 1908; Jan. 1 to Mar. 12 and Dec. 25–31, 1910; Jan. 10 to Feb. 7 and Feb. 19 to Mar. 3, 1911; Jan. 1–5, 1912; Feb. 6–20, Dec. 1–19, 1913; Dec. 5, 1916, to Jan. 5, 1917; Jan. 21, 29–31; Feb. 1, 16–28; Mar. 1–11, 1917.

See table of monthly discharge for estimates of mean flow for full months.

Estimates of discharge for periods of less than one month, not shown on table of daily discharge, were as follows: Mar. 1–12, 1910, 120 second-feet; Jan. 10 to Feb. 7, 1911, 100 second-feet; Feb. 19 to Mar. 3, 1911, 80 second-feet; Feb. 6–20, 1913, 75 second-feet; Dec. 1–19, 1913, 140 second-feet. Daily and monthly discharge recomputed Apr. 1, 1904 to May 31, 1905. The original estimate of mean discharge for March, 1907, was revised by means of discharge measurements Mar. 20 and 30 of that year.

From Jan. 1 to some time in April, 1909, and Nov. 23 to Dec. 31 of the same year, stage-discharge relation affected by ice, but no estimates were made except Nov. 23–30, when the open-channel rating curve was used. Rough estimates of monthly means were based on weekly gage heights and open-channel rating curve. These means are given in the table of mean monthly discharge but were not considered sufficiently accurate to be included with the computed records for the year. The records for 1909 are, in general, unsatisfactory, as they do not check the results obtained on Swiftcurrent Creek near Babb, nor those on St. Mary River at Cook's ranch.

In the previously published records for 1911 the daily discharge for Feb. 14 was given as 4 second-feet, with a note stating that this low stage was probably due to the water being held back by the ice at the outlet of St. Mary Lake at the time the gage-height observation was taken and that the discharge for the day was probably considerably greater. The discharge for Feb. 14, 1911, therefore, has been estimated at 46 second-feet, which is the same as the discharge on Feb. 13 and 15.

Jan. 1 to Mar. 25, 1912, ice present in stream, but open-channel rating was assumed applicable except Jan. 1–5, which was estimated.

Oct. 1, 1915, Swiftcurrent Creek was turned into St. Mary Lake above the gage. Discharge Nov. 1–10, 1915, estimated at 70 per cent of flow at Kimball. Dec. 20–31, 1915, estimated mean 145 second-feet, or approximately 90 per cent of flow at Kimball.

Jan. 1–18, 1916, mean flow estimated 90 second-feet from flow at Kimball.

Monthly discharge of St. Mary River near Babb, Mont., 1902–1917.

[Drainage area, 177 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1902.						
January	.....	.....	110	0.62	0.71	6,764
February	.....	.....	120	.68	.71	6,664
March	.....	.....	100	.56	.65	6,149
April	223	120	146	.82	.91	8,688
May	4,000	190	1,729	9.77	11.26	106,312
June	3,760	950	1,862	10.52	11.74	110,796
July	4,360	1,160	2,164	12.23	14.10	133,059
August	1,160	565	785	4.44	5.12	48,267
September	515	258	342	1.93	2.15	20,350
October	258	190	221	1.25	1.44	13,589
November	190	127	156	.88	.98	9,282
December	.....	.....	130	.73	.84	7,993
The year	.....	.....	655	3.70	50.61	477,913
1903.						
January	158	72	93	.53	.61	5,718
February	72	72	72	.41	.43	3,999
March	72	50	57	.32	.37	3,505
April	223	72	129	.73	.81	7,676
May	2,110	223	743	4.20	4.84	45,685
June	3,640	2,110	3,154	17.82	19.89	187,676
July	3,280	1,160	1,832	10.35	11.93	112,645
August	1,160	675	860	4.86	5.60	52,879
September	1,160	465	643	3.63	4.05	38,261
October	1,090	465	646	3.65	4.20	39,721
November	465	295	379	2.14	2.39	22,552
December	335	295	305	1.72	1.98	18,753
The year	3,640	50	743	4.20	57.10	539,070
1904.						
January	.....	.....	120	.68	.78	7,380
February	.....	.....	80	.45	.49	4,600
March	.....	.....	80	.45	.52	4,920
April	688	30	204	1.15	1.28	12,100
May	2,020	748	1,150	6.50	7.49	70,700
June	2,300	1,660	1,930	10.90	12.16	115,000
July	1,840	748	1,380	7.80	8.99	84,800
August	748	384	639	3.61	4.16	39,300
September	578	223	326	1.84	2.05	19,400
October	223	106	174	.983	1.13	10,700
November	106	69	81.4	.460	.51	4,840
December	69	55	55.5	.314	.36	3,410
The year	2,300	.....	519	2.93	39.92	377,000

Monthly discharge of St. Mary River near Babb, Mont., 1902–1917—Continued.

[Drainage area, 177 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1905.						
January	.....	.....	45	0.254	0.29	2,767
February	.....	.....	40	.226	.24	2,221
March	159	69	98	.554	.64	6,030
April	430	131	176	.994	1.11	10,500
May	950	384	648	3.66	4.22	39,800
June	1,890	925	1,454	8.21	9.16	86,520
July	1,220	855	1,015	5.73	6.61	62,410
August	855	325	577	3.26	3.76	35,480
September	325	210	270	1.53	1.71	16,070
October	665	210	425	2.40	2.77	26,130
November	285	175	204	1.15	1.28	12,140
December	.....	.....	170	.960	1.11	10,450
The year	1,890	.....	429	2.42	32.90	310,500
1906.						
January	.....	.....	70	.396	.46	4,300
February	.....	.....	65	.367	.38	3,610
March	90	65	82.7	.467	.54	5,080
April	555	90	218	1.23	1.37	13,000
May	1,140	610	841	4.75	5.48	51,700
June	1,720	925	1,300	7.34	8.19	77,400
July	1,630	790	1,220	6.89	7.94	75,000
August	790	555	649	3.67	4.23	39,900
September	610	285	432	2.44	2.72	25,700
October	725	285	421	2.38	2.74	25,900
November	790	555	666	3.76	4.20	39,600
December	555	175	283	1.60	1.84	17,400
The year	1,720	.....	521	2.94	40.09	379,000
1907.						
January	.....	.....	80	.452	.52	4,920
February	.....	.....	110	.622	.65	6,110
March	.....	.....	150	.849	.98	9,220
April	388	142	234	1.32	1.47	13,900
May	1,710	388	1,010	5.71	6.58	62,100
June	2,980	1,370	2,370	13.4	14.92	141,000
July	2,980	1,290	2,090	11.8	13.61	129,000
August	1,290	640	893	5.05	5.82	54,900
September	905	532	694	3.94	4.40	41,300
October	532	202	343	1.94	2.24	21,100
November	202	90	136	.769	.86	8,090
December	90	47	74.5	.421	.49	4,580
The year	2,980	.....	686	3.88	52.54	496,000
1908.						
January	.....	.....	57	.322	.37	3,500
February	.....	.....	112	.633	.68	6,440
March	.....	.....	190	1.07	1.23	11,700
April	1,130	171	474	2.68	2.99	28,200
May	1,670	835	1,300	7.34	8.46	79,900
June	7,980	1,460	3,400	19.2	21.42	202,000
July	1,680	832	1,380	7.80	8.99	84,800
August	800	418	554	3.13	3.61	34,100
September	372	266	301	1.70	1.90	17,900
October	328	208	264	1.49	1.72	16,200
November	247	.....	214	1.21	1.35	12,700
December	.....	.....	120	.678	.78	7,380
The year	7,980	.....	696	3.93	53.50	505,000
1909.						
May	1,960	161	479	2.71	3.12	29,500
June	3,900	1,860	2,670	15.1	16.85	159,000
July	2,180	407	1,320	7.46	8.60	81,200
August	1,130	538	775	4.38	5.05	47,700
September	605	252	383	2.16	2.41	22,800
October	252	161	217	1.23	1.42	13,300
November	515	161	399	2.25	2.51	23,700
The period	.....	.....	.....	.....	.....	377,000

Monthly discharge of St. Mary River near Babb, Mont., 1902–1917—Continued.

[Drainage area, 177 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1910.						
January	.....	.....	90	0.508	0.59	5,530
February	.....	.....	100	.565	.59	5,500
March	330	.....	169	.955	1.10	10,400
April	1,290	230	519	2.93	3.27	30,900
May	1,660	935	1,250	7.06	8.14	76,900
June	1,710	1,060	1,380	7.80	8.70	82,100
July	1,100	550	793	4.48	5.16	48,800
August	525	230	363	2.05	2.36	22,300
September	330	215	255	1.44	1.61	15,200
October	875	330	573	3.24	3.74	35,200
November	500	295	433	2.45	2.73	25,800
December	260	.....	193	1.09	1.26	11,900
The year	1,710	.....	511	2.88	39.25	371,000
1911.						
January	.....	.....	85.3	.482	.56	5,240
February	.....	.....	77.3	.437	.46	4,290
March	102	62	76.2	.431	.50	4,690
April	390	80	154	.870	.97	9,160
May	1,440	500	988	5.58	6.43	60,800
June	2,460	815	1,950	11.0	12.27	116,000
July	1,520	700	991	5.60	6.46	60,900
August	675	390	529	2.99	3.45	32,500
September	675	370	600	3.39	3.78	35,700
October	550	182	330	1.87	2.16	20,300
November	182	70	129	.729	.81	7,680
December	90	33	54.0	.305	.35	3,320
The year	2,460	.....	498	2.81	38.20	361,000
1912.						
January	73	.....	65.3	.369	.43	4,020
February	73	57	60.6	.342	.37	3,490
March	57	45	50.0	.282	.33	3,070
April	309	57	158	.893	1.00	9,400
May	1,680	253	979	5.53	6.38	60,200
June	1,520	1,200	1,360	7.68	8.57	80,900
July	1,360	700	920	5.20	6.00	56,600
August	755	386	560	3.16	3.64	34,400
September	366	235	321	1.81	2.02	19,100
October	257	166	211	1.19	1.37	13,000
November	257	180	225	1.27	1.42	13,400
December	195	88	135	.763	.88	8,300
The year	1,680	.....	422	2.38	32.41	306,000
1913.						
January	79	64	68.8	.389	.45	4,230
February	.....	.....	76.8	.434	.45	4,270
March	152	40	106	.599	.69	6,520
April	365	31	187	1.06	1.18	11,100
May	3,080	385	885	5.00	5.76	54,400
June	3,480	1,760	2,540	14.4	16.07	151,000
July	2,280	815	1,250	7.06	8.14	76,900
August	815	590	688	3.89	4.48	42,300
September	645	232	389	2.20	2.46	23,100
October	232	203	222	1.25	1.44	13,700
November	232	176	207	1.17	1.30	12,300
December	.....	.....	115	.650	.75	7,070
The year	3,480	31	562	3.18	43.17	407,000

Monthly discharge of St. Mary River near Babb, Mont., 1902–1917—Continued.

[Drainage area, 177 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1914.						
January	67	48	61.1	0.345	0.40	3,760
February	90	64	75.8	.428	.45	4,210
March	99	90	94.2	.532	.61	5,790
April	590	108	232	1.31	1.46	13,800
May	1,600	590	1,170	6.61	7.62	71,900
June	1,760	935	1,280	7.23	8.07	76,200
July	1,200	490	874	4.94	5.70	53,700
August	540	367	436	2.46	2.84	26,800
September	445	248	321	1.81	2.02	19,100
October	540	349	433	2.45	2.82	26,600
November	515	218	395	2.23	2.49	23,500
December	215	111	173	.977	1.13	10,600
The year	1,760	48	464	2.62	35.61	336,000
1915.						
January	114	59	81.0	.458	.53	4,980
February	83	64	72.7	.411	.43	4,040
March	72	55	59.7	.337	.39	3,670
April	524	76	243	1.37	1.53	14,500
May	1,110	600	854	4.82	5.56	52,500
June	1,260	854	1,060	5.99	6.68	63,100
July	1,330	653	911	5.15	5.94	56,000
August	680	408	557	3.15	3.63	34,200
September	574	304	405	2.29	2.56	24,100
October	653	386	498	1.79	2.06	30,600
November	530	304	409	1.47	1.64	24,300
December	304	.....	200	.719	.83	12,300

[Drainage area, 278 square miles.]

1916.						
January	.....	.....	109	.392	.45	6,700
February	168	135	156	.561	.60	8,970
March	470	168	349	1.26	1.45	21,500
April	615	376	485	1.74	1.94	28,900
May	2,130	640	1,270	4.57	5.27	78,100
June	5,560	1,270	3,290	11.8	13.17	196,000
July	4,540	1,310	2,840	10.2	11.76	175,000
August	1,230	877	1,050	3.78	4.36	64,600
September	1,570	498	900	3.24	3.62	53,600
October	471	171	305	1.10	1.27	18,800
November	352	154	209	.752	.84	12,400
December	171	110	137	.493	.57	8,420
The year	5,560	.....	925	3.33	45.30	673,000
1917.						
January	108	89	94.2	.339	.39	5,790
February	89	70	80.1	.288	.30	4,450
March	81	73	80.0	.288	.33	4,920
April	205	66	127	.457	.51	7,560
May	3,280	205	1,640	5.90	6.80	101,000
June	4,160	2,510	3,390	12.2	13.61	202,000
July	2,880	1,170	2,110	7.59	8.75	130,000
August	1,010	520	700	2.52	2.90	43,000
September	511	355	391	1.41	1.57	23,300
October	371	199	298	1.07	1.23	18,300
November	272	127	199	.716	.80	11,800
December	157	66	118	.424	.49	7,260
The year	4,160	66	772	2.78	37.68	559,000

NOTE.—1909: Mean discharge for January, February, March, and December estimated from weekly gage heights and open channel rating curve. Mean for April estimated from flow of Swiftcurrent Creek near Babb.

1915: Swiftcurrent Creek diverted into St. Mary River above this station on October 1, 1915. Yearly summary for 1915 not computed because results obtained before and after Swiftcurrent Creek was diverted are not comparable.

Mean monthly discharge, in second-feet, of St. Mary River near Babb, Mont., 1902–1915.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total in acre-feet.
1902	a110	a120	a100	146	1,730	1,860	2,160	785	342	221	156	a130	478,000
1903	93	72	57	129	743	3,150	1,830	860	643	646	379	305	539,000
1904	a120	a 80	a 80	204	1,150	1,930	1,380	639	326	174	81.4	a 55.5	377,000
1905	a 45	a 40	98.0	176	648	1,450	1,020	577	270	425	204	a170	310,000
1906	a 70	a 65	82.7	218	841	1,300	1,220	649	432	421	666	283	379,000
1907	a 80	a110	a150	234	1,010	2,370	2,090	893	694	343	136	74.5	496,000
1908	a 57	a112	a190	474	1,300	3,400	1,380	554	301	264	214	a120	505,000
1909	a 95	a 85	a115	a220	479	2,670	1,320	775	383	217	399	a270	425,000
1910	a 90	a100	169	519	1,250	1,380	793	363	255	573	433	193	371,000
1911	85.3	77.3	76.2	154	988	1,950	991	529	600	330	129	54	361,000
1912	65.3	60.6	50.0	158	979	1,360	920	560	321	211	225	135	306,000
1913	68.8	76.8	106	187	885	2,540	1,250	688	389	222	207	115	407,000
1914	61.1	75.8	94.2	232	1,170	1,280	874	436	321	433	395	173	336,000
1915	81.0	72.7	59.7	243	854	1,060	911	557	405	.....	.....	.....	.....
Average	80.1	81.9	102	235	1,000	1,980	1,300	633	406	345	279	160	407,000
Median	80.5	77.0	97.1	211	984	1,900	1,240	598	362	330	214	173	407,000
Maximum	120	120	190	519	1,730	3,400	2,160	893	694	646	666	305	539,000
Minimum	45	40	50	129	479	1,060	793	363	255	174	81.4	54	306,000

a Estimated.

NOTE.—Oct. 1, 1915, Swiftcurrent Creek was diverted into St. Mary Lake above this station, and the discharge thereafter is not included in the above table because not comparable with the discharge previous to that date. The median flow given was obtained by arranging the monthly means in their order of magnitude and taking the middle mean, or, if their number was even, the average of the two middle means. By using daily discharge a somewhat lower median discharge would be obtained.

ST. MARY RIVER BELOW SWIFTCURRENT CREEK, AT BABB, MONT.

LOCATION.—In sec. 15, T. 36 N., R. 14 W., about a mile below mouth of Swiftcurrent Creek, at Babb, on Blackfeet Reservation, in Teton County.

DRAINAGE AREA.—298 square miles.

RECORDS AVAILABLE.—July 14, 1901, to October 18, 1902; May 13, 1910, to September 30, 1915, when station was discontinued.

GAGE.—Stevens water-stage recorder on right bank opposite Babb post office. From July 14, 1901, to October 18, 1902, a staff gage on the left pier of a highway bridge about 100 feet above the location of the water-stage recorder, and at a different datum, was used; this gage was destroyed by the flood of June 5, 1908. From May 13, 1910, to July 18, 1911, a staff gage was maintained on the left bank about 75 feet below the original gage and at a different datum; a temporary chain gage was used for low-water readings. From July 19, 1911, to April 21, 1915, an overhanging chain gage was maintained on the right bank at the same datum and location as the water-stage recorder and at the same datum as the staff gage on left bank, but on account of conditions in the channel the gages on opposite banks did not read the same. Beginning January 1, 1913, separate gaging stations were maintained on St. Mary River and Swiftcurrent Creek overflow, and the results at the two stations were added to give the total flow of the river at Babb; previous to that date only the gage on St. Mary River was read, the discharge of the overflow being included in discharge measurements. As the discharge of the overflow was a small part of the total flow and varied with the flow of Swiftcurrent Creek, ceasing entirely at low stages, only a small error resulted from this procedure.

DISCHARGE MEASUREMENTS.—Made from the cable 50 feet above gage or by wading. Small overflow channel from Swiftcurrent Creek measured from a footbridge.

CHANNEL AND CONTROL.—Bed of stream composed of gravel and cobblestones; shifts slightly. A small overflow channel from Swiftcurrent Creek enters about 100 feet below gage on left bank.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 6.5 feet July 4, 1902 (discharge, 6,690 second-feet); minimum stage recorded, 3.48 feet March 15–25, 1912 (discharge, 64 second-feet).

WINTER FLOW.—Discharge relation slightly affected by ice; flow estimated.
DIVERSIONS.—None.
REGULATION.—None.
ACCURACY.—Stage-discharge relation permanent except during high-water periods. Discharge measurements indicate these changes. Record good.

Discharge measurements of St. Mary River below Swiftcurrent Creek, at Babb, Mont., 1900–1902 and 1910–1915.

Date.	Made by—	Gage height.	Discharge.
1900.		*Feet.*	*Sec.-ft.*
June 16	.....	.....	750
18	.....	2.90	2,294
Aug. 6	.....	1.60	750
Oct. 1	.....	1.10	552
1901.			
July 20	.....	2.60	1,827
Aug. 2	.....	2.15	1,479
Oct. 9	.....	.80	424
30	.....	.53	311
Nov. 5	.....	.42	285
1902.			
Apr. 9	J. S. Baker.....	0.10	168
Aug. 22	W. B. Freeman.....	1.50	944
Sept. 2	.....do.....	1.11	661
22	C. T. Prall.....	.61	420
30	W. B. Freeman.....	.61	407
Oct. 8	C. T. Prall.....	.57	402
17	.....do.....	.55	402
23	.....do.....	.35	311
30	.....do.....	.25	281
1910.			
May 13	W. A. Lamb.....	6.40	2,050
June 10	M. E. McChristie.....	6.20	1,930
25	W. A. Lamb.....	5.78	1,460
Aug. 1	M. E. McChristie.....	4.70	795
Sept. 15	.....do.....	3.82	312
Nov. 19	W. A. Lamb.....	4.55	681
Dec. 29	B. E. Jones.....	3.38	115
1911.			
Mar. 15	B. E. Jones.....	3.40	89
May 4	.....do.....	5.13	1,050
6	.....do.....	5.76	1,520
June 5	.....do.....	7.66	3,210
25	W. A. Lamb.....	7.60	3,240
July 19	.....do.....	5.60	1,340
Aug. 25	B. E. Jones.....	4.67	542
Oct. 12	.....do.....	4.55	500
Dec. 8	.....do.....	3.81	138
1912.			
Mar. 16	W. A. Lamb.....	3.45	58
May 1	.....do.....	4.65	514
June 8	R. R. Randell.....	6.05	1,580
July 2	.....do.....	6.38	1,740
Aug. 17	W. A. Lamb.....	4.88	687
Sept. 19	.....do.....	4.52	458
Dec. 16	.....do.....	3.89	177
1913.			
Mar. 30	W. A. Lamb.....	3.65	111
May 18	.....do.....	5.40	971
June 12	R. R. Randell.....	7.96	4,030
27	W. A. Lamb.....	7.12	2,720
July 31	.....do.....	5.72	1,120
Aug. 21	.....do.....	5.27	866
Sept. 14	.....do.....	4.67	424
Oct. 24	.....do.....	4.38	299
Dec. 19	.....do.....	3.91	124
1914.			
May 22	W. A. Lamb.....	6.68	2,220
June 20	.....do.....	6.79	2,260
July 21	.....do.....	5.56	1,230
Sept. 9	.....do.....	4.57	454
Nov. 7	.....do.....	5.28	905
Dec. 16	B. E. Jones.....	4.17	207
1915.			
Feb. 19	W. A. Lamb.....	3.80	90
24	.....do.....	5.22	766
May 26	.....do.....	5.56	1,050
June 22	.....do.....	6.12	1,560
July 18	B. E. Jones.....	5.52	1,030
Aug. 10	Lamb and Hoyt.....	5.22	826

NOTE.—Dec. 29, 1910, and Mar. 15, 1911, ice at gage.
1911: July 19, new gage installed on bank opposite gage previously used and at new datum.
1914: Dec. 16, ice at gage but probably not enough to cause backwater.
Discharge measurements beginning Mar. 16, 1912, do not include the overflow from Swiftcurrent Creek, which was computed separately; previous to that date the main river and overflow were combined in measurements and computations.

Discharge measurements of Swiftcurrent Creek overflow at Babb, Mont., 1912–1915.

Date.	Made by—	Gage height.	Discharge.
1912.		*Feet.*	*Sec.-ft.*
May 1	W. A. Lamb.....	5.55	44.7
June 8	.....do.....	6.25	108
July 2	R. R. Randell.....	6.37	110
Aug. 17	W. A. Lamb.....	5.45	40.2
Sept. 19	.....do.....	5.0	12.7
Dec. 16	.....do.....	4.4	2.0
1913.			
Mar. 30	W. A. Lamb.....	.....	0
May 18	.....do.....	6.3	108
June 12	R. R. Randell.....	7.0	170
June 27	W. A. Lamb.....	6.15	88
July 31	.....do.....	5.18	21
Aug. 21	.....do.....	4.91	10
Sept. 14	.....do.....	4.6	4
1915.			
July 18	B. E. Jones.....	4.81	4.9

NOTE.—1912: Dec. 16, discharge estimated.

Daily discharge, in second-feet, of St. Mary River below Swiftcurrent Creek, at Babb, Mont., 1901–1902 and 1910–1915.

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1901.							1901.						
1	.....	1,574	653	465	326	273	16	2,164	833	587	405	273	220
2	.....	1,515	653	465	326	273	17	2,046	795	587	405	273	220
3	.....	1,338	631	445	307	273	18	1,928	795	566	405	273	207
4	.....	1,279	631	425	307	259	19	1,928	760	566	405	273	207
5	.....	1,220	631	425	273	259	20	1,928	760	566	405	259	207
6	.....	1,161	653	425	273	259	21	1,869	760	545	385	259	207
7	.....	1,161	677	425	273	245	22	1,869	730	545	385	259	195
8	.....	1,102	677	425	259	245	23	1,869	730	525	385	259	195
9	.....	1,102	653	425	273	245	24	1,810	730	505	385	273	195
10	.....	1,043	609	425	307	245	25	1,869	702	505	365	273	195
11	.....	1,043	587	425	326	232	26	1,869	702	505	365	273	185
12	.....	984	566	425	345	232	27	1,810	702	505	345	289	185
13	.....	925	566	425	326	232	28	1,810	677	485	345	289	185
14	2,341	925	566	405	326	220	29	1,751	677	485	345	289	185
15	2,223	833	566	405	307	220	30	1,633	677	485	326	289	185
							31	1,574	653	.....	326	.....	185

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1902.												
1	185	232	185	165	373	4,130	2,910	1,507	750	424	.....	.....
2	175	232	185	165	394	3,886	3,276	1,406	690	.....	.....	.....
3	175	232	185	165	394	3,642	6,387	1,328	630	.....	.....	.....
4	175	232	185	175	415	3,276	6,692	1,252	612	.....	.....	.....
5	175	232	175	175	458	3,154	5,838	1,219	612	.....	.....	.....
6	155	220	175	185	479	2,910	4,862	1,219	612	.....	.....	.....
7	155	220	175	185	501	2,788	4,618	1,219	612	.....	.....	.....
8	155	220	175	195	544	2,788	3,642	1,219	612	.....	.....	.....
9	155	220	185	195	630	2,910	3,154	1,252	565	.....	.....	.....
10	146	220	185	195	790	3,032	2,910	1,252	565	.....	.....	.....
11	146	207	185	207	960	3,032	2,666	1,252	565	.....	.....	.....
12	146	207	195	207	1,202	2,910	2,483	1,214	542	.....	.....	.....
13	155	207	195	220	1,568	2,910	2,300	1,176	542	.....	.....	.....
14	195	207	195	220	2,178	2,788	2,178	1,138	518	.....	.....	.....
15	195	195	195	220	2,544	2,910	2,056	1,100	494	.....	.....	.....
16	207	195	195	245	2,910	2,788	1,934	1,062	518	.....	.....	.....
17	207	195	195	273	3,398	2,666	1,934	1,062	518	400	.....	.....
18	220	195	195	273	3,520	2,544	1,812	1,062	494	.....	.....	.....
19	220	195	185	305	3,154	2,422	1,690	1,024	494	.....	.....	.....
20	220	195	185	305	3,886	2,300	1,568	986	470	.....	.....	.....
21	220	185	185	305	4,862	2,178	1,690	1,024	424	.....	.....	.....
22	207	185	185	321	4,252	2,544	1,690	986	424	.....	.....	.....
23	207	185	175	321	4,130	2,544	1,812	910	424	312	.....	.....
24	207	185	175	338	4,252	2,544	1,812	910	424	.....	.....	.....
25	207	185	175	338	4,130	2,544	1,934	910	424	.....	.....	.....
26	207	185	175	355	4,008	2,788	1,934	910	424	.....	.....	.....
27	207	185	165	355	3,947	2,788	1,934	876	424	.....	.....	.....
28	207	185	165	355	4,069	2,788	1,934	876	424	.....	.....	.....
29	220	.....	165	373	4,374	2,788	1,812	842	424	.....	.....	.....
30	220	.....	165	373	4,618	2,910	1,751	811	424	275	.....	.....
31	220	.....	165	.....	4,252	.....	1,628	780	.....	.....	.....	.....

Daily discharge, in second-feet, of St. Mary River below Swiftcurrent Creek, at Babb, Mont., 1901–1902 and 1910–1915—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1910.												
1	.....	.....	.....	.....	.....	2,200	1,560	782	322	655	770	395
2	.....	.....	.....	.....	.....	2,240	1,520	722	300	895	770	395
3	.....	.....	.....	.....	.....	2,200	1,520	710	300	1,100	710	395
4	.....	.....	.....	.....	.....	1,960	1,460	682	300	1,100	655	395
5	.....	.....	.....	.....	.....	1,920	1,430	710	300	1,100	606	345
6	.....	.....	.....	.....	.....	1,850	1,390	628	300	1,100	545	345
7	.....	.....	.....	.....	.....	1,850	1,320	520	300	1,170	600	345
8	.....	.....	.....	.....	.....	2,000	1,300	600	345	1,440	545	345
9	.....	.....	.....	.....	.....	1,910	1,260	628	345	1,560	545	345
10	.....	.....	.....	.....	.....	1,820	1,220	600	345	1,520	545	300
11	.....	.....	.....	.....	.....	1,820	1,200	600	345	1,480	600	300
12	.....	.....	.....	.....	.....	1,900	1,000	589	300	1,480	928	300
13	.....	.....	.....	.....	2,050	2,000	1,070	572	300	1,400	928	300
14	.....	.....	.....	.....	2,000	1,940	1,030	572	300	1,320	895	300
15	.....	.....	.....	.....	1,940	1,940	1,060	545	300	1,170	830	300
16	.....	.....	.....	.....	1,860	1,960	1,060	545	322	1,140	770	255
17	.....	.....	.....	.....	1,740	1,960	1,100	495	395	928	710	255
18	.....	.....	.....	.....	1,620	2,020	1,130	495	395	895	655	255
19	.....	.....	.....	.....	1,730	1,940	1,130	495	495	830	655	255
20	.....	.....	.....	.....	1,680	1,900	1,100	445	655	770	655	255
21	.....	.....	.....	.....	1,640	1,850	1,070	445	655	710	655	255
22	.....	.....	.....	.....	1,520	1,760	1,100	445	655	655	600	255
23	.....	.....	.....	.....	1,600	1,640	1,070	445	600	600	600	255
24	.....	.....	.....	.....	1,640	1,520	980	445	545	545	545	255
25	.....	.....	.....	.....	2,030	1,620	950	445	572	655	545	210
26	.....	.....	.....	.....	2,160	1,560	985	445	520	1,030	495	210
27	.....	.....	.....	.....	2,200	1,560	928	395	495	1,030	495	210
28	.....	.....	.....	.....	2,160	1,600	862	370	495	960	495	170
29	.....	.....	.....	.....	2,200	1,600	830	322	495	895	445	130
30	.....	.....	.....	.....	2,200	1,560	800	345	495	830	445	130
31	.....	.....	.....	.....	2,240	.....	770	345	.....	830	.....	95
1911.												
1	.....	.....	.....	170	895	2,070	2,340	1,150	512	805	291	152
2	.....	.....	.....	170	895	2,430	2,250	1,150	512	765	291	135
3	.....	.....	.....	170	960	2,800	2,160	1,200	512	725	268	135
4	.....	.....	95	170	1,100	3,180	2,250	1,060	1,060	687	246	135
5	.....	.....	130	170	1,240	3,360	2,250	1,060	1,200	649	246	135
6	.....	.....	170	170	1,560	2,980	2,340	973	1,150	614	246	135
7	.....	.....	170	170	1,640	3,080	2,340	973	1,100	578	168	135
8	.....	.....	130	170	1,640	2,980	2,250	1,020	1,060	578	152	135
9	.....	.....	130	170	1,720	2,980	2,070	1,060	1,060	512	135	135
10	.....	.....	130	170	1,640	2,980	1,890	1,060	1,060	512	135	120
11	.....	.....	130	170	1,560	3,180	1,640	1,020	1,060	512	135	120
12	.....	.....	95	210	1,560	3,270	1,560	973	1,060	482	135	106
13	.....	.....	95	210	1,640	3,460	1,480	888	1,100	482	135	106
14	.....	.....	95	170	1,640	3,560	1,400	888	1,100	451	168	106
15	.....	.....	95	170	2,340	3,560	1,400	805	1,100	451	205	93
16	.....	.....	95	210	2,430	3,360	1,400	805	1,060	451	246	93
17	.....	.....	95	210	2,430	3,360	1,480	805	1,060	451	246	80
18	.....	.....	95	210	2,340	3,360	1,480	765	1,100	422	246	80
19	.....	.....	130	255	2,250	3,360	1,340	765	1,100	394	246	80
20	.....	.....	130	300	2,250	3,270	1,390	725	1,060	394	246	80
21	.....	.....	130	395	2,070	2,980	1,340	725	1,060	394	246	80
22	.....	.....	130	445	2,070	2,980	1,340	687	1,020	368	246	80
23	.....	.....	130	495	1,800	2,980	1,240	649	1,060	368	205	80
24	.....	.....	170	600	1,800	3,080	1,240	614	1,100	368	205	80
25	.....	.....	170	710	1,720	3,180	1,150	578	1,150	368	205	80
26	.....	.....	170	770	1,640	2,890	1,150	578	1,100	368	205	.....
27	.....	.....	170	830	1,560	2,800	1,100	545	1,060	368	205	.....
28	.....	.....	170	895	1,480	2,610	1,060	545	1,020	341	205	.....
29	.....	.....	170	895	1,320	2,430	1,060	545	973	341	168	.....
30	.....	.....	170	895	1,400	2,610	1,060	512	888	316	152	.....
31	.....	.....	170	.....	1,400	.....	1,100	512	.....	291	.....	.....

Daily discharge, in second-feet, of St. Mary River below Swiftcurrent Creek, at Babb, Mont., 1901–1902 and 1910–1915.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1912.												
1	.....	.....	91	104	525	2,080	2,000	1,250	461	334	361	307
2	.....	.....	91	113	601	2,090	2,000	1,320	489	312	359	307
3	.....	.....	91	184	598	2,000	2,000	1,160	461	312	359	307
4	.....	.....	91	203	597	1,920	1,910	1,090	461	311	357	285
5	.....	.....	91	167	625	1,900	1,830	1,020	433	311	356	285
6	.....	118	91	184	635	1,870	1,740	1,050	433	289	332	285
7	.....	118	91	184	754	1,850	1,730	976	457	289	330	242
8	.....	118	91	234	904	1,820	1,650	1,010	459	310	308	242
9	.....	113	91	276	1,140	1,910	1,570	933	487	289	307	242
10	.....	113	86	307	1,300	1,930	1,480	823	489	267	306	242
11	.....	104	86	367	1,300	2,090	1,410	857	489	247	308	242
12	.....	104	80	372	1,380	2,170	1,350	753	517	247	332	203
13	.....	96	73	372	1,460	2,180	1,350	720	521	267	357	203
14	.....	91	68	382	1,530	2,250	1,280	716	550	248	385	203
15	.....	91	64	382	1,700	2,250	1,270	784	521	291	389	167
16	.....	91	64	398	1,990	2,170	1,260	688	521	316	393	167
17	.....	91	64	409	2,120	2,090	1,180	649	521	342	420	167
18	.....	91	64	420	2,110	2,000	1,180	625	493	369	396	167
19	.....	91	64	437	2,190	1,920	1,170	652	489	423	396	150
20	.....	91	64	454	2,270	1,920	1,170	621	461	399	396	150
21	.....	91	64	465	2,270	1,920	1,170	618	461	399	372	150
22	.....	91	64	465	2,270	1,920	1,260	587	489	420	372	150
23	.....	91	64	495	2,170	1,910	1,260	618	435	420	365	150
24	.....	91	64	525	2,090	1,910	1,350	618	461	417	361	150
25	.....	91	64	525	2,090	1,910	1,430	618	483	393	356	150
26	.....	91	68	557	2,100	1,910	1,430	587	359	365	332	134
27	.....	91	68	557	2,100	1,920	1,430	557	357	365	332	134
28	.....	91	68	557	2,100	1,920	1,430	554	357	413	332	134
29	.....	91	73	557	2,090	2,000	1,420	525	357	389	307	134
30	.....	.....	80	557	2,090	2,000	13,340	521	346	389	307	118
31	.....	.....	80	.....	2,090	.....	13,300	521	.....	385	.....	118
1913.												
1	122	46	95	95	723	4,410	2,910	1,140	736	286	345	260
2	108	46	82	95	723	4,540	2,820	1,140	702	266	345	260
3	108	70	108	95	723	4,550	2,610	1,140	702	226	345	220
4	108	95	108	95	759	4,260	2,350	1,140	736	226	345	220
5	108	95	122	82	661	4,250	2,170	1,180	736	246	345	220
6	108	.....	122	70	692	4,250	2,210	1,140	636	266	345	220
7	108	.....	108	82	688	3,950	2,210	1,060	669	268	345	220
8	108	.....	137	95	653	3,950	2,150	1,110	634	268	345	280
9	95	.....	137	95	645	3,890	2,080	1,190	667	268	345	220
10	95	.....	137	122	558	4,080	2,030	1,280	485	268	345	220
11	95	.....	137	122	586	4,150	2,090	1,240	404	268	300	220
12	95	.....	137	152	661	4,020	1,970	1,240	430	264	260	220
13	108	.....	152	192	731	3,870	1,920	1,320	485	266	260	220
14	108	.....	168	232	877	3,800	1,760	1,110	510	268	260	300
15	108	.....	168	417	819	3,700	1,600	1,190	511	270	260	300
16	108	.....	168	522	889	3,360	1,450	1,120	456	268	260	30
17	95	.....	152	731	1,030	3,170	1,320	1,250	457	264	260	70
18	95	.....	184	1,080	1,190	3,160	1,360	1,040	459	264	260	115
19	95	.....	201	1,330	1,200	2,830	1,310	949	406	266	260	115
20	95	.....	201	1,260	1,200	2,780	1,260	904	406	288	260	115
21	108	.....	218	1,140	1,280	2,780	1,310	824	406	288	260	115
22	70	.....	201	1,010	1,370	2,590	1,310	866	406	288	240	115
23	70	.....	184	1,080	1,470	2,510	1,310	837	408	268	260	90
24	58	.....	184	964	1,920	2,570	1,350	830	358	268	260	90
25	46	95	152	861	2,200	2,390	1,310	830	360	310	260	90
26	35	108	137	836	2,850	2,500	1,390	873	313	310	260	90
27	35	95	108	869	3,270	2,830	1,310	830	313	310	260	90
28	35	95	122	865	4,060	3,320	1,360	898	307	332	260	90
29	46	.....	122	795	4,410	3,240	1,360	866	309	310	260	90
30	46	.....	108	727	4,340	2,920	1,370	824	266	316	260	90
31	46	.....	108	.....	4,610	.....	1,140	704	.....	355	.....	90

Daily discharge, in second-feet, of St. Mary River below Swiftcurrent Creek, at Babb, Mont., 1901–1902 and 1910–1915—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1914.												
1	.....	.....	132	150	980	1,920	1,480	764	531	672	610	340
2	.....	.....	132	150	1,230	1,980	1,450	753	510	781	620	320
3	.....	.....	132	150	1,740	1,990	1,400	742	490	857	650	290
4	.....	.....	132	150	1,700	2,160	1,530	737	480	743	750	260
5	.....	.....	132	150	1,500	2,210	1,640	732	470	707	850	250
6	.....	.....	132	150	1,410	2,330	1,720	722	460	707	950	250
7	.....	.....	132	185	1,400	2,210	1,780	711	460	707	974	240
8	.....	.....	132	185	1,450	2,000	1,680	701	461	700	895	235
9	.....	.....	132	202	1,550	1,820	1,680	670	461	690	782	220
10	.....	.....	132	202	1,750	1,680	1,680	630	442	680	781	220
11	.....	.....	132	185	1,650	1,560	1,590	590	433	680	817	220
12	.....	.....	132	185	1,860	1,630	1,500	560	423	650	817	210
13	.....	.....	132	260	1,740	1,760	1,500	520	383	650	742	220
14	.....	.....	132	300	1,850	1,960	1,400	471	373	675	742	230
15	.....	.....	132	300	1,740	2,190	1,400	471	373	750	740	240
16	.....	.....	132	370	1,980	2,180	1,310	462	373	933	670	240
17	.....	.....	132	460	2,340	2,180	1,310	508	384	972	600	230
18	.....	.....	132	515	2,350	2,300	1,300	572	444	1,050	568	220
19	.....	.....	132	515	2,470	2,300	1,220	711	446	1,130	535	220
20	.....	.....	132	519	2,350	2,400	1,140	711	508	1,090	535	220
21	.....	.....	132	665	2,470	2,300	1,140	706	543	1,040	568	202
22	.....	.....	132	812	2,230	2,090	1,140	708	680	1,020	535	202
23	.....	.....	150	957	2,230	1,900	979	703	715	1,000	480	202
24	.....	.....	150	994	2,290	1,810	975	698	719	928	440	190
25	.....	.....	185	994	2,290	1,810	975	680	719	820	410	185
26	.....	.....	185	994	2,290	1,700	975	650	719	775	390	175
27	.....	.....	132	957	2,180	1,590	975	628	653	730	370	150
28	.....	.....	132	957	2,120	1,580	898	603	719	725	360	150
29	.....	.....	150	950	2,010	1,480	898	581	719	680	350	185
30	.....	.....	150	943	1,990	1,480	896	561	719	630	340	185
31	.....	.....	150	.....	1,870	.....	894	541	.....	630	.....	178
1915.												
1	185	115	90	122	1,430	1,200	1,790	955	625	.....	.....	.....
2	202	122	90	143	1,430	1,290	1,790	920	685	.....	.....	.....
3	185	132	90	185	1,340	1,380	1,790	918	950	.....	.....	.....
4	150	115	95	204	1,270	1,480	1,780	918	988	.....	.....	.....
5	150	115	90	222	1,260	1,580	1,680	883	915	.....	.....	.....
6	115	132	90	263	1,440	1,580	1,680	882	810	.....	.....	.....
7	122	90	102	295	1,640	1,580	1,580	847	745	.....	.....	.....
8	122	102	102	303	1,740	1,580	1,580	847	685	.....	.....	.....
9	132	95	115	305	1,740	1,570	1,570	847	715	.....	.....	.....
10	132	95	115	305	1,750	1,570	1,570	812	715	.....	.....	.....
11	132	95	102	305	1,750	1,370	1,470	812	685	.....	.....	.....
12	115	95	102	350	1,750	1,370	1,370	812	655	.....	.....	.....
13	115	95	115	400	1,650	1,370	1,280	812	625	.....	.....	.....
14	150	92	90	455	1,750	1,290	1,190	812	598	.....	.....	.....
15	145	90	90	483	1,860	1,370	1,100	811	520	.....	.....	.....
16	140	90	90	510	1,650	1,470	1,020	811	520	.....	.....	.....
17	135	90	90	510	1,540	1,480	1,020	779	520	.....	.....	.....
18	135	90	90	636	1,440	1,670	1,020	779	625	.....	.....	.....
19	130	90	102	639	1,340	1,670	991	779	745	.....	.....	.....
20	125	90	102	642	1,250	1,670	918	746	745	.....	.....	.....
21	125	102	102	642	1,170	1,570	920	779	685	.....	.....	.....
22	125	90	102	782	1,070	1,570	920	745	685	.....	.....	.....
23	120	90	115	782	993	1,580	920	745	625	.....	.....	.....
24	120	90	115	743	992	1,580	920	715	625	.....	.....	.....
25	120	90	115	776	1,070	1,780	955	685	625	.....	.....	.....
26	115	90	122	740	1,070	1,890	993	685	570	.....	.....	.....
27	115	90	122	740	1,070	1,900	993	685	570	.....	.....	.....
28	115	90	102	740	1,070	1,890	1,030	655	520	.....	.....	.....
29	122	.....	115	846	1,160	1,890	1,030	655	520	.....	.....	.....
30	115	.....	115	1,170	1,020	1,790	994	655	520	.....	.....	.....
31	132	.....	102	.....	993	.....	955	655	.....	.....	.....	.....

NOTE.—1901: Determinations of daily discharge for November and December revised slightly by making rating curve for 1901 agree with curve for 1902 below gage height 0.50 foot.

1902: Daily discharge for January, February, and March ascertained by applying open-channel rating curve to observed gage heights; results may be somewhat high but the error is probably not great though

the discharge for February appears to be about 50 second-feet too large. Determinations of discharge Sept. 22 to Oct. 18, 1902, have been revised as original computations were based on incorrect gage readings.

1910, Dec. 24–31: Ice present at gage but open-water rating curve assumed applicable.

1911: Stage-discharge relation affected by ice Jan. 1 to Mar. 3 and Dec. 26–31; mean discharge Mar. 1–3 estimated at 95 second-feet and Dec. 26–31 at 65 second-feet. See table of monthly discharge for estimates for January and February.

1912: Stage-discharge relation affected by ice Jan. 1 to Feb. 5; discharge estimated as follows—Jan. 1–12, 80 second-feet; Jan. 13 to Feb. 5, 110 second-feet.

1913: Stage-discharge relation affected by ice Feb. 6–24; discharge estimated at 150 second-feet.

1914: Stage-discharge relation affected by ice Jan. 1 to Feb. 28; discharge estimated. Daily discharge also estimated for following periods, on account of unreliable gage readings due to disturbance of gage by high water: May 2–7, June 8–16, June 22 to July 20, Aug. 1–16, Aug. 21 to Sept. 17, Oct. 8–15, 21–31, Nov. 1–6, 23–30, Dec. 1–9 and 24–26.

1915: Stage-discharge relation affected by ice Feb. 10–18; discharge estimated. Oct. 25, previously published discharge believed to be high and has been revised by comparison with stations near Babb and near Kimball.

Monthly discharge of St. Mary River below Swiftcurrent Creek, at Babb, Mont., 1901–1902 and 1910–1915.

[Drainage area, 298 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1901.						
July 14–31	.....	.....	1,906	6.40	4.29	68,049
August	1,574	653	932	3.13	3.61	57,306
September	677	485	576	1.93	2.15	34,274
October	465	326	401	1.35	1.56	24,657
November	345	259	289	.97	1.08	17,197
December	273	185	222	.74	.85	13,650
The period	.....	.....	.....	.....	.....	215,133
1902.						
January	220	146	193	.65	.75	11,867
February	232	185	205	.69	.72	11,385
March	195	165	181	.61	.70	11,129
April	373	165	257	.86	.96	15,292
May	4,862	373	2,490	8.36	9.67	153,104
June	4,130	2,178	2,873	9.64	10.76	170,955
July	6,692	1,568	2,737	9.18	10.59	168,292
August	1,507	780	1,090	3.66	4.22	67,010
September	750	424	488	1.64	1.83	29,038
October	424	.....	367	1.23	1.42	22,566
The period	.....	.....	.....	.....	.....	660,638
1910.						
May 13–31	2,240	1,520	1,910	6.41	4.53	72,000
June	2,240	1,520	1,850	6.21	6.92	110,000
July	1,560	770	1,140	3.83	4.42	70,100
August	782	322	528	1.77	2.04	32,500
September	655	300	416	1.40	1.56	24,800
October	1,560	545	1,030	3.46	3.99	63,300
November	928	445	641	2.15	2.40	38,100
December	395	95	276	.926	1.07	17,000
The period	.....	.....	.....	.....	.....	428,000
1911.						
January	.....	.....	155	.520	.60	9,530
February	.....	.....	140	.470	.49	7,780
March	170	95	150	.436	.50	7,990
April	895	170	358	1.20	1.34	21,300
May	2,430	895	1,680	5.64	6.50	103,000
June	3,560	2,070	3,040	10.2	11.38	181,000
July	2,340	1,060	1,600	5.37	6.19	98,400
August	1,200	512	827	2.78	3.20	50,800
September	1,200	512	1,020	3.42	3.82	60,700
October	805	291	478	1.60	1.84	29,400
November	291	135	208	.698	.77	12,400
December	152	.....	99.5	.334	.39	6,120
The year	3,560	.....	812	2.72	37.02	588,000

Monthly discharge of St. Mary River below Swiftcurrent Creek, at Babb, Mont., 1901–1902 and 1910–1915—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1912.						
January	.....	.....	98.4	0.330	0.38	6,050
February	118	.....	99.7	.335	.36	5,730
March	91	64	75.9	.255	.29	4,670
April	557	104	374	1.26	1.41	22,300
May	2,270	525	1,590	5.34	6.16	97,800
June	2,250	1,820	1,990	6.68	7.45	118,000
July	2,000	1,170	1,460	4.90	5.65	89,800
August	1,320	521	775	2.60	3.00	47,700
September	550	346	461	1.55	1.73	27,400
October	423	247	340	1.14	1.31	20,900
November	420	306	353	1.18	1.32	21,000
December	307	118	196	.658	.76	12,100
The year	2,270	64	653	2.19	29.82	473,000
1913.						
January	122	35	86.0	.289	.33	5,290
February	.....	.....	128	.430	.45	7,110
March	218	82	144	.483	.56	8,850
April	1,330	70	537	1.80	2.01	32,000
May	4,610	558	1,540	5.17	5.96	94,700
June	4,550	2,390	3,490	11.7	13.05	208,000
July	2,910	1,140	1,750	5.87	6.77	108,000
August	1,320	704	1,030	3.46	3.99	63,300
September	736	266	489	1.64	1.83	29,100
October	355	226	277	.930	1.07	17,000
November	345	240	289	.970	1.08	17,200
December	300	30	164	.550	.63	10,100
The year	4,610	.....	829	2.78	37.73	601,000
1914.						
January	.....	.....	90	.302	.35	5,530
February	.....	.....	110	.369	.38	6,110
March	185	132	138	.463	.53	8,480
April	994	150	484	1.62	1.81	28,800
May	2,470	980	1,900	6.38	7.36	117,000
June	2,400	1,480	1,950	6.54	7.30	116,000
July	1,780	894	1,310	4.40	5.07	80,600
August	764	462	639	2.14	2.47	39,300
September	718	373	527	1.77	1.98	31,400
October	1,130	630	800	2.68	3.09	49,200
November	974	340	629	2.11	2.35	37,400
December	340	150	222	.745	.86	13,600
The year	2,470	.....	737	2.47	33.55	533,000
1915.						
January	202	115	134	.450	.52	8,240
February	122	90	98.6	.331	.34	5,480
March	122	90	103	.346	.40	6,330
April	1,170	122	508	1.70	1.90	30,200
May	1,860	992	1,380	4.63	5.34	84,800
June	1,900	1,200	1,570	5.27	5.88	93,400
July	1,790	918	1,260	4.23	4.88	77,500
August	955	655	788	2.64	3.04	48,500
September	988	520	667	2.24	2.50	39,700
The period	.....	.....	.....	.....	.....	394,150

NOTE.—See footnote to tables of daily discharge for description of revisions and for periods estimated.

Mean monthly discharge, in second-feet, of St. Mary River including Swiftcurrent Creek at Babb,[a] Mont., 1901–1902, 1910–1917.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total in acre-feet.
1901	.....	.....	.....	.....	.....	.....	[b]1,910	932	576	401	289	222	[c]215,000
1902	193	205	181	257	2,490	2,870	2,740	1,030	488	[d]367	.....	.....	[c]661,000
1910	.....	.....	.....	.....	[e]1,910	1,850	1,140	528	416	1,030	641	276	[c]428,000
1911	[f]155	[f]140	130	358	1,680	3,040	1,600	827	1,020	478	208	99.5	588,000
1912	[f]98.4	99.7	75.9	374	1,590	1,990	1,460	775	461	340	353	196	473,000
1913	86.0	128	144	537	1,540	3,490	1,750	1,030	489	277	289	164	601,000
1914	[f]90	[f]110	138	484	1,900	1,950	1,310	639	527	800	629	222	533,000
1915	134	98.6	103	508	1,380	1,570	1,260	788	667	498	409	200	394,000
1916	109	156	349	485	1,270	3,290	2,840	1,050	900	305	209	137	673,000
1917	94.2	80.1	80.0	127	1,640	3,390	2,110	700	391	298	199	118	559,000
Average	120	127	150	391	1,710	2,600	1,810	836	594	479	358	182	546,000
Median	104	119	134	429	1,640	2,870	1,680	808	508	384	289	196	559,000
Maximum	193	205	349	537	2,490	3,490	2,840	1,090	1,020	1,030	641	276	673,000
Minimum	86	80.1	75.9	127	1,270	1,570	1,140	528	391	277	199	99.5	394,000

[a] See note.
[b] July 14–31.
[c] Not included in average.
[d] Oct. 1–18.
[e] May 13–31.
[f] Estimatd.

NOTE.—1901–1902 and 1910 to Sept. 30, 1915, discharge obtained from records of St. Mary River below Swiftcurrent Creek at Babb. On Oct. 1, 1915, Swiftcurrent Creek was diverted into St. Mary Lake, and from that date on the records on St. Mary River near Babb were used. The run-off at the two points is nearly identical, Duck Creek being the only tributary between. In computing means for the period of record the means for the three partial months were considered the means for full months. The median flow given was obtained by arranging the monthly means in their order of magnitude and taking the middle mean, or, if their number was even, the average of the two middle means. By using daily discharge a somewhat lower median discharge would be obtained.

ST. MARY RIVER AT COOK'S RANCH, ALTA., NEAR INTERNATIONAL BOUNDARY.

LOCATION.—In SE. ¼ sec. 6, T. 1 N., R. 25 W. fourth meridian, at Cook's ranch, half a mile north of the international boundary, about a mile below the mouth of Boundary Creek, and 17 miles southeast of Cardston, Alta., Canada.

DRAINAGE AREA.—452 square miles.

RECORDS AVAILABLE.—September 4, 1902, to December 31, 1912. The station was then moved to a point near Kimball, about 8 miles downstream, and a joint international station was established. The discharge at the two points is practically the same.

GAGE.—An overhanging chain gage fastened to a tree on the left bank, a quarter of a mile below Cook's house. From September 4, 1902, to June, 1908, an overhanging gage about one-fourth mile upstream was read; this gage was washed out by the flood in June, 1908, and replaced July 27, 1908, at the new site.

DISCHARGE MEASUREMENTS.—Made from a cable one-fourth mile above gage.

CHANNEL AND CONTROL.—Bed of stream is composed of gravel of medium size. Rapids just below gage; current swift at practically all stages. The banks not subject to overflow except during extreme floods, but the left bank is gently sloping, so that the stream is probably 200 to 300 feet wider at high than at low stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 12.75 feet June 5, 1908 (discharge, estimated by comparison with record for station near Babb, 18,000 second-feet); minimum stage recorded November 19, 1904 (discharge by current-meter measurement 96 second-feet). Lower stages probably occurred during the winter months for which records of daily discharge are not available. (See hydrograph, Pl. III.)

ICE.—Stage-discharge relation seriously affected by ice during winter months.

DIVERSON.—None during the period of this record.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent; affected by shifting control and ice. Records for 1909 do not agree with records obtained by Canada at Kimball, being from 10 to 37 per cent lower. They also appear low when compared with combined flow of St. Mary River above Swiftcurrent Creek and Swiftcurrent Creek; but current-meter measurements by W. A. Lamb made at Kimball, Alta., are much lower than the results obtained by Canada. Records at all four stations for 1909 should be used with caution. Records for October, November, and December, 1903, and June to November, 1904, appear low when compared with the combined flow of St. Mary River above Swiftcurrent Creek and Swiftcurrent Creek. It is impossible to determine where the error lies, but as it is not very great it was thought best to base computations of the run-off at each station on the data obtained at that station. Considered as a whole the record is fair.

Discharge measurements of St. Mary River at Cook's ranch, Alta., near international boundary, 1902–1912.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1902.		*Feet.*	*Sec.-ft.*	1908.		*Feet.*	*Sec.-ft.*
Oct. 11	.....	3.90	501	Apr. 18	A. F. Huch.....	4.40	777
23	.....	3.65	387	Aug. 26	Stewart and Huch.....	2.58	691
				Oct. 7	A. F. Huch.....	1.83	425
1903.				1909.			
May 11	F. M. Brown.....	4.76	1,131	June 14	W. A. Lamb.....	6.15	4,350
11	.....do.....	4.76	1,085	July 8	.....do.....	5.20	3,020
11	.....do.....	4.76	1,125	Sept. 16	J. E. Stewart.....	1.47	527
June 5	C. T. Prall.....	7.05	5,953	Oct. 14	W. A. Lamb.....	1.16	387
23	.....do.....	6.55	4,406				
Aug. 3	.....do.....	5.20	1,730	1910.			
Oct. 5	.....do.....	4.80	1,325	Apr. 20	.....do.....	2.85	1,240
				May 13	.....do.....	4.15	2,450
1904.				June 10	M. E. McChristie.....	3.90	2,220
May 10	L. R. Stockman.....	4.88	1,337	24	W. A. Lamb.....	3.32	1,640
June 9	W. B. Freeman.....	6.02	3,288	July 31	M. E. McChristie.....	1.98	793
July 12	Robert Follansbee.....	5.60	2,468	Sept. 14	.....do.....	1.06	374
30	W. B. Freeman.....	4.82	1,213	Nov. 19	B. E. Jones.....	1.93	700
Sept. 3	.....do.....	4.03	608	20	W. A. Lamb.....	1.90	698
Nov. 19	L. R. Stockman.....	2.45	96	Dec. 29	B. E. Jones.....	.....	134
1905.				1911.			
Apr. 27	.....do.....	4.40	918	May 5	.....do.....	2.87	1,240
May 30	H. M. Morse.....	5.11	1,480	5	.....do.....	2.87	1,280
June 17	.....do.....	5.60	2,460	June 6	.....do.....	5.26	3,260
July 19	Morse and Crain.....	4.96	1,420	7	.....do.....	5.14	3,220
Aug. 12	A. M. Crain.....	4.59	1,017	24	W. A. Lamb.....	5.47	3,610
Sept. 5	.....do.....	3.71	416	July 18	.....do.....	3.02	1,610
25	H. M. Morse.....	3.53	324	Aug. 26	B. E. Jones.....	1.75	698
Nov. 17	W. B. Freeman.....	3.30	255	Oct. 13	.....do.....	1.64	610
				Dec. 7	.....do.....	.33	223
1906.							
Apr. 1	Freeman and Edson...	2.90	138	1912.			
May 12	W. B. Freeman.....	5.10	1,350	Apr. 30	W. A. Lamb.....	1.80	675
Aug. 20	.....do.....	4.29	746	June 7	.....do.....	3.45	1,870
Sept. 13	Richards and Hartman.	4.13	650	30	R. R. Randell.....	3.80	2,090
				Aug. 16	W. A. Lamb.....	2.00	786
1907.				Sept. 19	.....do.....	1.40	529
May 15	J. E. Stewart.....	5.35	1,840				
June 7	J. B. Pierson.....	6.68	4,560				
July 2	.....do.....	6.68	4,700				
Aug. 8	.....do.....	5.15	1,560				
Sept. 7	Follansbee and Pierson	4.88	1,240				

NOTE.—1906: May 12, meter probably not in good order, giving results too low.

1909: June 14 and July 8, measurements made from highway bridge at Kimball, 8 miles below gage; discharge of A. R. and I. canal at Kimball measured separately and included in total discharge.
1910: Dec. 29, stage-discharge relation affected by ice.
1911: Dec. 7, no ice at gage or control.

Daily discharge, in second-feet, of St. Mary River at Cook's ranch, Alta., near international boundary, 1902–1912.

Day.	Sept.	Oct.	Nov.	Day.	Sept.	Oct.	Nov.	Day.	Sept.	Oct.	Nov.
1902.											
1	595	575	306	11	575	515	385	21	640	515	385
2	595	575	306	12	575	487	410	22	640	515	385
3	747	608	325	13	575	515	385	23	575	385	385
4	747	575	325	14	575	575	385	24	640	365	365
5	710	515	325	15	198	545	365	25	575	365	385
6	640	515	306	16	640	545	365	26	640	325	240
7	640	515	306	17	575	545	385	27	575	325	271
8	640	515	325	18	575	545	385	28	575	325	174
9	640	515	365	19	575	515	365	29	640	325	225
10	640	515	385	20	575	515	385	30	575	306	365
								31	.....	306	.....

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1903.												
1	.....	.....	.....	.....	870	4,200	4,855	1,900	1,008	1,687	575	607
2	.....	.....	.....	.....	870	5,135	4,325	1,900	960	1,490	545	640
3	.....	.....	.....	.....	900	5,725	4,080	1,755	900	1,370	460	675
4	.....	.....	.....	.....	1,055	5,725	3,835	1,687	870	1,315	460	675
5	.....	.....	.....	.....	1,055	5,875	3,835	1,490	870	1,260	515	607
6	.....	.....	.....	.....	1,155	5,875	3,955	1,490	900	1,208	545	575
7	.....	.....	.....	.....	1,260	5,875	3,955	1,490	900	1,055	545	575
8	.....	.....	.....	.....	1,315	6,175	3,605	1,430	900	1,055	827	575
9	.....	.....	.....	.....	1,260	5,725	3,380	1,430	960	870	870	545
10	.....	.....	.....	.....	1,260	5,725	3,272	1,555	1,008	870	675	460
11	.....	.....	.....	.....	1,260	5,430	3,165	1,525	960	960	640	385
12	.....	.....	.....	.....	1,260	5,135	3,060	1,490	960	900	607	385
13	.....	.....	.....	365	1,430	5,425	2,955	1,370	900	870	545	365
14	.....	.....	.....	385	1,370	5,425	2,955	1,430	827	870	545	365
15	.....	.....	.....	515	1,490	5,280	2,855	1,370	785	900	435	385
16	.....	.....	.....	960	1,620	5,135	2,475	1,315	747	900	365	410
17	.....	.....	.....	1,008	1,900	5,725	2,565	1,315	710	930	365	435
18	.....	.....	.....	1,055	1,900	5,575	2,475	1,260	710	960	365	385
19	.....	.....	.....	960	2,055	5,425	2,385	1,260	710	827	365	410
20	.....	.....	.....	870	2,055	5,425	2,300	1,208	747	785	385	410
21	.....	.....	.....	785	2,055	5,135	2,215	1,208	827	747	575	400
22	.....	.....	.....	827	1,900	4,855	2,300	1,155	1,105	785	575	385
23	.....	.....	.....	827	2,055	4,455	2,215	1,155	1,208	747	545	365
24	.....	.....	.....	785	2,135	4,455	2,475	1,260	1,315	747	515	345
25	.....	.....	.....	900	2,135	4,075	2,475	1,260	1,620	675	545	365
26	.....	.....	.....	960	2,565	4,075	2,385	1,490	2,300	640	515	365
27	.....	.....	.....	870	3,060	4,075	2,215	1,430	2,135	640	575	325
28	.....	.....	.....	870	2,660	4,720	2,135	1,370	1,900	607	487	288
29	.....	.....	.....	870	2,385	5,280	2,055	1,260	1,832	607	515	288
30	.....	.....	.....	827	2,565	4,855	1,900	1,155	1,687	575	575	306
31	.....	.....	.....	.....	2,660	.....	1,987	1,105	.....	575	.....	288

Daily discharge, in second-feet, of St. Mary River at Cook's ranch, Alta, near international boundary, 1902–1912—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1904.												
1	240	255	.....	400	1,755	2,990	2,470	1,160	640	272	150	140
2	240	271	.....	400	1,828	3,020	2,580	1,160	608	272	150	140
3	240	271	.....	400	1,755	3,050	2,580	1,160	575	272	150	140
4	288	271	.....	400	1,755	3,080	2,470	1,110	575	288	140	170
5	255	.....	.....	400	1,555	3,110	2,470	1,110	575	288	130	170
6	211	.....	.....	400	1,490	3,380	2,470	1,110	545	288	120	150
7	198	.....	.....	400	1,490	3,900	2,470	1,160	515	288	110	150
8	198	.....	.....	400	1,430	3,640	2,690	1,160	515	272	115	150
9	198	.....	.....	400	1,370	3,380	2,580	1,220	515	272	120	190
10	240	.....	.....	400	1,260	3,140	2,470	1,160	460	255	120	190
11	240	.....	.....	710	1,370	2,910	2,370	1,110	460	255	110	210
12	240	.....	.....	608	1,430	2,800	2,370	1,060	460	242	110	242
13	271	.....	.....	608	1,370	2,470	2,090	960	460	242	110	190
14	240	.....	.....	640	1,430	2,370	2,090	960	388	230	110	160
15	240	.....	.....	640	1,490	2,370	2,000	915	388	220	110	170
16	225	.....	.....	575	1,555	2,690	2,000	915	388	210	110	170
17	225	.....	.....	608	1,688	3,140	1,840	870	388	210	110	180
18	174	.....	.....	640	1,828	3,380	1,700	870	345	210	110	190
19	174	.....	.....	675	2,055	3,380	1,560	960	345	210	110	190
20	174	.....	.....	785	2,135	3,380	1,440	960	325	200	110	190
21	186	.....	.....	870	2,300	3,380	1,380	960	325	190	140	150
22	198	.....	.....	915	2,955	3,140	1,320	915	325	190	140	150
23	225	.....	.....	915	3,165	3,140	1,320	870	306	180	150	150
24	225	.....	.....	960	3,273	2,800	1,320	710	345	170	150	150
25	225	.....	.....	960	3,165	2,690	1,320	710	325	170	150	150
26	225	.....	.....	1,055	2,755	2,370	1,320	640	325	160	150	150
27	211	.....	.....	1,155	2,565	2,270	1,320	575	306	160	150	150
28	211	.....	.....	1,370	2,385	2,270	1,270	608	306	160	150	150
29	240	.....	.....	1,490	2,565	2,180	1,270	640	288	160	150	150
30	240	.....	.....	1,555	2,660	2,270	1,220	575	288	160	150	150
31	240	.....	.....	.....	2,855	.....	1,220	640	.....	160	.....	150
1905.												
1	.....	.....	190	190	710	1,987	1,987	1,430	460	325	545	.....
2	.....	.....	190	180	675	2,300	1,987	1,370	460	325	487	.....
3	.....	.....	190	180	675	2,660	1,987	1,260	435	575	410	.....
4	.....	.....	190	180	640	2,955	1,900	1,155	410	1,055	410	.....
5	.....	.....	190	180	640	3,165	1,987	1,155	410	1,155	410	.....
6	.....	.....	190	180	640	3,165	1,987	1,055	410	1,315	385	.....
7	.....	.....	200	190	640	3,272	1,900	1,055	410	1,370	365	.....
8	.....	.....	200	190	827	3,165	1,900	1,055	410	1,370	365	.....
9	.....	.....	190	200	1,055	2,955	1,900	1,008	385	1,315	325	.....
10	.....	.....	190	210	1,155	2,755	1,987	1,055	385	1,208	325	.....
11	.....	.....	190	210	1,105	2,755	1,987	1,055	385	1,105	325	.....
12	.....	.....	190	210	1,105	2,755	1,900	1,055	385	960	325	.....
13	.....	.....	190	220	1,055	2,855	1,900	960	385	960	306	.....
14	.....	.....	210	220	1,055	2,855	1,755	960	365	900	288	.....
15	.....	.....	190	220	1,055	2,660	1,687	900	365	870	271	.....
16	.....	.....	180	220	960	2,565	1,555	870	385	785	255	.....
17	.....	.....	170	210	1,008	2,385	1,555	785	385	785	240	.....
18	.....	.....	180	210	1,105	2,215	1,490	747	385	747	255	.....
19	.....	.....	180	220	1,260	2,135	1,370	675	365	640	225	.....
20	.....	.....	190	230	1,490	1,987	1,315	607	365	575	211	.....
21	.....	.....	180	242	1,900	1,987	1,315	575	345	515	211	.....
22	.....	.....	190	242	1,987	2,300	1,315	575	288	487	211	.....
23	.....	.....	180	255	1,900	2,215	1,315	575	306	460	225	.....
24	.....	.....	180	325	1,687	2,055	1,315	575	325	460	225	.....
25	.....	.....	180	460	1,620	1,987	1,370	545	325	515	211	.....
26	.....	.....	190	534	1,620	2,135	1,370	545	325	515	225	.....
27	.....	.....	190	608	1,555	1,987	1,430	545	306	515	225	.....
28	.....	.....	190	870	1,555	1,900	1,430	545	306	515	225	.....
29	.....	.....	190	785	1,620	1,832	1,370	545	325	515	225	.....
30	.....	.....	180	747	1,620	1,900	1,315	515	325	545	225	.....
31	.....	.....	180	.....	1,755	.....	1,315	515	.....	545	.....	.....

Daily discharge, in second-feet, of St. Mary River at Cook's ranch, Alta., near international boundary, 1902–1912—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1906.												
1	.....	.....	.....	160	1,055	2,135	2,135	1,105	1,008	410	1,260	607
2	.....	.....	.....	163	1,105	2,260	2,055	960	1,008	435	1,160	607
3	.....	.....	.....	163	1,155	2,385	2,055	960	900	487	1,060	575
4	.....	.....	.....	174	1,155	2,475	2,135	900	900	575	960	545
5	.....	.....	.....	186	1,155	2,660	2,215	870	870	640	960	515
6	.....	.....	.....	198	1,155	2,660	2,215	785	827	675	900	515
7	.....	.....	.....	211	1,105	2,565	2,215	747	785	675	870	460
8	.....	.....	.....	240	1,105	2,300	2,215	747	785	640	827	410
9	.....	.....	.....	255	1,155	2,300	2,385	710	785	607	785	435
10	.....	.....	.....	255	1,208	2,300	2,385	710	747	640	785	410
11	.....	.....	.....	255	1,260	2,300	2,385	710	710	640	785	365
12	.....	.....	.....	271	1,490	2,660	2,385	747	675	640	960	345
13	.....	.....	.....	271	1,620	2,612	2,385	785	675	640	1,060	325
14	.....	.....	.....	271	1,832	2,565	2,055	827	607	640	1,160	288
15	.....	.....	.....	271	1,987	2,385	1,987	870	575	640	1,560	271
16	.....	.....	.....	288	1,900	2,385	1,900	870	545	640	1,560	255
17	.....	.....	.....	325	1,900	2,215	1,755	848	515	640	1,620	255
18	.....	.....	.....	345	1,620	2,300	1,832	827	487	640	1,620	255
19	.....	.....	.....	385	1,555	2,055	1,755	827	460	675	1,620	255
20	.....	.....	.....	435	1,555	1,987	1,687	785	460	710	1,370	271
21	.....	.....	.....	460	1,490	1,832	1,555	827	460	675	1,430	271
22	.....	.....	.....	607	1,555	1,987	1,490	960	460	640	1,320	288
23	.....	.....	.....	747	1,555	2,135	1,430	1,055	460	640	1,260	306
24	.....	.....	.....	1,055	1,620	1,900	1,430	1,208	487	640	1,160	306
25	.....	.....	.....	1,055	1,654	1,832	1,370	1,430	487	640	1,010	325
26	.....	.....	.....	1,105	1,687	2,066	1,342	1,370	487	960	960	325
27	.....	.....	.....	1,105	1,687	2,300	1,315	1,315	460	1,210	870	306
28	.....	.....	.....	1,105	1,755	2,475	1,208	1,260	410	1,490	827	288
29	.....	.....	.....	1,055	1,832	2,215	1,105	1,155	410	1,490	710	255
30	.....	.....	.....	1,008	1,832	2,300	1,105	1,105	385	1,420	675	255
31	.....	.....	.....	.....	1,900	.....	1,105	1,055	.....	1,320	.....	255
1907.												
1	.....	.....	.....	225	590	3,620	4,830	2,010	1,330	1,040	365	240
2	.....	.....	.....	271	590	4,200	4,700	1,930	1,330	1,040	345	240
3	.....	.....	.....	325	620	4,450	4,570	1,780	1,230	950	345	240
4	.....	.....	.....	306	620	4,200	4,450	1,780	1,230	870	345	225
5	.....	.....	.....	306	620	3,960	4,450	1,710	1,230	830	325	218
6	.....	.....	.....	271	652	4,330	3,960	1,640	1,230	830	325	211
7	.....	.....	.....	255	870	4,700	3,720	1,640	1,230	792	306	211
8	.....	.....	.....	271	952	4,830	3,490	1,570	1,180	792	288	198
9	.....	.....	.....	306	995	4,700	3,260	1,540	1,085	755	271	198
10	.....	.....	.....	365	1,230	4,200	3,260	1,510	1,130	755	255	174
11	.....	.....	.....	432	1,450	3,960	3,260	1,450	1,150	720	255	153
12	.....	.....	.....	480	1,710	3,840	3,040	1,450	1,160	685	247	153
13	.....	.....	.....	505	1,780	3,720	3,260	1,390	1,180	668	240	153
15	.....	.....	.....	532	1,855	3,600	3,150	1,330	1,180	652	240	134
15	.....	.....	.....	532	2,010	3,490	3,040	1,280	1,180	652	225	132
16	.....	.....	.....	560	2,630	3,370	2,930	1,280	1,230	560	211	130
17	.....	.....	.....	590	3,040	3,260	2,830	1,180	1,280	560	211	130
18	.....	.....	.....	590	3,490	3,260	2,830	1,130	1,330	532	198	130
19	.....	.....	.....	590	3,370	3,370	2,730	995	1,280	532	198	130
20	.....	.....	.....	590	3,260	3,490	2,630	952	1,280	505	198	130
21	.....	.....	.....	620	3,040	4,420	2,630	952	1,230	505	186	125
22	.....	.....	.....	620	3,040	5,350	2,730	910	1,230	480	174	125
23	.....	.....	.....	652	2,730	5,620	2,630	830	1,230	480	174	125
24	.....	.....	.....	652	2,440	4,830	2,530	910	1,230	480	174	125
25	.....	.....	.....	652	2,260	4,570	2,480	995	1,230	455	174	125
26	.....	.....	.....	685	2,260	4,450	2,440	952	1,180	455	198	120
27	.....	.....	.....	652	2,090	4,830	2,260	995	1,180	432	198	120
28	.....	.....	.....	620	2,090	4,960	2,350	1,280	1,180	410	211	120
29	.....	.....	.....	620	2,090	5,220	2,090	1,280	1,180	410	211	120
30	.....	.....	.....	590	2,440	4,960	2,090	1,390	1,085	387	225	120
31	.....	.....	.....	.....	3,040	.....	2,010	1,330	.....	365	.....	120

Daily discharge, in second-feet, of St. Mary River at Cook's ranch, Alta., near international boundary, 1902–1912—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	.....	.....	.....	255	1,340	5,360	2,580	1,180	475	440	458	510
2	.....	.....	.....	255	1,390	4,960	2,580	1,100	458	425	458	545
3	.....	.....	.....	255	1,390	4,450	2,750	1,100	458	425	475	545
4	.....	.....	.....	345	1,450	6,440	2,800	1,040	458	425	475	564
5	.....	.....	.....	255	1,510	18,000	3,000	1,006	458	418	475	564
6	.....	.....	.....	255	1,720	17,000	3,050	975	449	410	458	573
7	.....	.....	.....	255	1,930	15,000	3,000	948	440	410	458	582
8	.....	.....	.....	240	2,440	13,000	2,800	920	440	410	458	564
9	.....	.....	.....	225	2,630	11,000	2,800	895	440	495	458	.....
10	.....	.....	.....	240	2,730	9,000	2,850	882	440	380	458	.....
11	.....	.....	.....	272	2,730	7,400	2,850	870	440	380	475	.....
12	.....	.....	.....	325	3,040	7,000	2,850	848	440	365	475	.....
13	.....	.....	.....	388	3,150	6,400	2,800	825	458	380	475	.....
14	.....	.....	.....	455	3,150	5,900	3,000	780	475	528	492	.....
15	.....	.....	.....	505	3,260	5,500	2,850	760	475	601	484	.....
16	.....	.....	.....	532	3,260	5,400	3,000	700	492	640	475	.....
17	.....	.....	.....	620	3,040	5,100	2,800	640	510	640	440	.....
18	.....	.....	.....	830	2,740	4,800	2,800	640	510	660	440	.....
19	.....	.....	.....	1,060	2,440	4,400	2,750	640	492	620	475	.....
20	.....	.....	.....	1,280	2,440	4,200	2,550	620	475	545	510	.....
21	.....	.....	.....	1,510	2,260	3,900	2,450	740	475	528	528	.....
22	.....	.....	.....	1,580	2,180	3,600	2,350	660	475	510	528	.....
23	.....	.....	.....	1,710	2,090	3,100	2,350	740	475	510	510	.....
24	.....	.....	.....	1,780	2,090	3,100	2,350	700	475	528	510	.....
25	.....	.....	.....	1,860	2,090	2,900	2,300	720	475	492	492	.....
26	.....	.....	.....	1,780	2,830	3,100	2,100	700	440	492	475	.....
27	.....	.....	.....	1,710	3,720	3,100	1,560	545	458	475	458	.....
28	.....	.....	.....	1,640	3,260	3,000	1,430	545	425	475	410	.....
29	.....	.....	.....	1,510	2,630	2,900	1,340	545	425	475	425	.....
30	.....	.....	.....	1,390	2,630	2,700	1,260	536	440	475	458	.....
31	.....	.....	.....	.....	3,490	.....	1,180	528	.....	466	.....	.....
1909.												
1	.....	.....	.....	.....	895	4,410	3,010	.....	.....	.....	265	.....
2	.....	.....	.....	.....	895	4,940	3,010	.....	.....	.....	288	.....
3	.....	.....	.....	.....	1,810	5,310	3,140	.....	.....	.....	348	.....
4	.....	.....	.....	.....	1,260	5,380	3,140	.....	.....	.....	545	.....
5	.....	.....	.....	.....	920	5,160	3,210	.....	.....	.....	828	.....
6	.....	.....	.....	.....	780	5,160	3,210	.....	.....	.....	800	.....
7	.....	.....	.....	.....	700	5,160	3,140	.....	.....	.....	745	.....
8	.....	.....	.....	.....	760	5,160	3,010	.....	.....	.....	745	.....
9	.....	.....	.....	.....	760	4,640	2,620	.....	.....	.....	720	.....
10	.....	.....	.....	.....	920	4,260	2,440	.....	.....	.....	720	.....
11	.....	.....	.....	.....	975	4,120	2,140	.....	.....	.....	695	.....
12	.....	.....	.....	.....	870	3,910	2,140	.....	.....	.....	645	.....
13	.....	.....	.....	.....	870	4,120	2,030	.....	.....	.....	620	.....
14	.....	.....	.....	.....	1,040	4,120	2,030	.....	.....	405	595	.....
15	.....	.....	.....	.....	1,070	4,560	1,810	.....	.....	385	495	.....
16	.....	.....	.....	.....	1,000	4,710	1,710	.....	.....	385	520	.....
17	.....	.....	.....	.....	920	4,860	1,610	.....	.....	365	520	.....
18	.....	.....	.....	.....	895	4,940	1,610	.....	545	365	595	.....
19	.....	.....	.....	.....	1,100	5,080	1,520	.....	495	365	570	.....
20	.....	.....	.....	.....	1,610	5,240	1,340	.....	495	365	595	.....
21	.....	.....	.....	.....	1,760	5,380	1,260	.....	495	365	.....	.....
22	.....	.....	.....	.....	1,980	4,860	1,180	.....	450	365	.....	.....
23	.....	.....	.....	700	2,320	4,560	1,070	.....	450	330	.....	.....
24	.....	.....	.....	975	2,560	4,260	1,070	.....	450	330	.....	.....
25	.....	.....	.....	1,380	2,880	3,980	1,040	.....	450	315	.....	.....
26	.....	.....	.....	1,430	3,280	3,770	1,180	.....	.....	300	.....	.....
27	.....	.....	.....	1,480	3,630	3,560	2,140	.....	.....	288	.....	.....
28	.....	.....	.....	.....	3,910	3,080	5,010	.....	.....	288	.....	.....
29	.....	.....	.....	.....	3,980	2,940	5,010	.....	.....	288	.....	.....
30	.....	.....	.....	.....	3,980	2,880	2,750	.....	.....	288	.....	.....
31	.....	.....	.....	.....	4,050	.....	2,750	.....	.....	275	.....	.....

Daily discharge, in second-feet, of St. Mary River at Cook's ranch, Alta., near international boundary, 1902–1912—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1910.												
1	.....	.....	.....	667	1,970	2,960	1,640	803	394	969	696	505
2	.....	.....	.....	643	1,720	2,960	1,600	777	374	1,090	696	461
3	.....	.....	.....	620	1,640	2,860	1,560	777	394	1,090	691	461
4	.....	.....	.....	620	1,640	2,810	1,530	726	374	1,150	691	418
5	.....	.....	.....	528	1,610	2,540	1,450	726	374	1,090	667	338
6	.....	.....	.....	596	1,700	2,310	1,420	701	374	1,150	687	338
7	.....	.....	.....	596	1,800	2,310	1,310	677	394	1,150	687	338
8	.....	.....	.....	643	2,490	2,580	1,310	701	374	1,270	682	338
9	.....	.....	.....	691	2,860	2,490	1,280	701	394	1,340	588	338
10	.....	.....	.....	790	2,770	2,220	1,210	677	374	1,330	634	.....
11	.....	.....	.....	816	2,670	2,310	1,150	677	374	1,470	760	.....
12	.....	.....	.....	896	2,490	2,390	1,120	653	380	1,470	885	.....
13	.....	.....	.....	1,040	2,490	2,380	1,150	653	387	1,350	1,010	.....
14	.....	.....	1,340	896	2,440	2,370	1,150	653	394	1,240	1,010	.....
15	.....	.....	1,270	1,010	2,440	2,360	1,120	630	374	1,120	896	.....
16	.....	.....	1,070	952	2,220	2,350	1,150	606	454	1,060	896	.....
17	.....	.....	740	982	1,760	2,390	1,120	584	584	1,060	842	.....
18	.....	.....	691	1,010	1,920	2,430	1,150	606	606	1,000	740	.....
19	.....	.....	691	1,140	2,130	2,370	1,150	561	606	940	691	.....
20	.....	.....	643	1,340	1,760	2,230	1,120	539	539	825	643	.....
21	.....	.....	596	1,420	1,880	2,130	1,120	517	630	825	740	.....
22	.....	.....	691	1,420	1,840	2,040	1,060	496	751	767	740	.....
23	.....	.....	716	1,380	2,300	1,820	1,090	475	768	716	740	.....
24	.....	.....	740	1,380	2,770	1,640	1,060	434	785	738	790	.....
25	.....	.....	691	1,490	2,810	1,670	1,060	374	803	761	740	.....
26	.....	.....	691	1,900	2,860	1,670	1,030	374	830	922	740	.....
27	.....	.....	740	2,820	2,960	1,710	940	355	857	918	691	.....
28	.....	.....	691	2,530	2,960	1,710	912	374	857	918	691	.....
29	.....	.....	691	2,520	2,960	1,670	830	394	912	894	691	.....
30	.....	.....	691	2,290	2,960	1,600	830	374	884	798	596	.....
31	.....	.....	691	.....	2,960	.....	803	394	.....	701	.....	.....
1911.												
1	.....	.....	.....	177	952	2,380	2,470	1,190	1,440	992	398	310
2	.....	.....	.....	181	952	3,320	2,390	1,190	1,440	963	390	295
3	.....	.....	.....	185	952	3,710	2,310	1,190	1,440	929	390	280
4	.....	.....	.....	177	1,140	3,810	2,230	1,100	1,440	901	371	265
5	.....	.....	.....	193	1,200	3,610	2,230	1,100	1,370	873	351	250
6	.....	.....	.....	203	1,790	3,260	2,070	1,100	1,370	846	351	235
7	.....	.....	.....	177	1,710	3,280	1,990	1,100	1,370	741	351	217
8	.....	.....	.....	185	1,710	3,280	1,930	1,100	1,290	766	344	202
9	.....	.....	.....	193	1,710	3,190	1,930	1,100	1,290	741	308	217
10	.....	.....	.....	213	1,710	3,100	1,700	1,100	1,230	711	280	217
11	.....	.....	.....	219	1,710	3,580	1,700	1,100	1,230	663	240	226
12	.....	.....	.....	225	1,640	3,790	1,640	1,100	1,160	639	210	226
13	.....	.....	.....	225	1,790	3,890	1,580	1,150	1,160	615	200	217
14	.....	.....	.....	225	1,870	3,890	1,580	1,150	1,220	615	210	202
15	.....	.....	.....	237	2,040	3,800	1,580	1,150	1,220	570	240	190
16	.....	.....	.....	237	3,810	3,700	1,580	1,070	1,290	570	280	190
17	.....	.....	.....	283	3,410	3,810	1,580	1,070	1,220	539	347	190
18	.....	.....	.....	300	3,120	3,810	1,580	1,070	1,160	517	387	180
19	.....	.....	.....	398	3,030	3,720	1,580	1,010	1,210	517	426	180
20	.....	.....	.....	377	2,650	3,620	1,580	952	1,210	517	446	170
21	.....	.....	.....	952	2,380	3,530	1,580	830	1,210	496	438	170
22	.....	.....	.....	842	2,380	3,340	1,500	830	1,280	496	418	170
23	.....	.....	.....	896	2,610	3,340	1,500	830	1,350	487	418	160
24	.....	.....	.....	953	2,840	3,540	1,350	830	1,280	487	418	160
25	.....	.....	.....	1,010	2,930	3,750	1,350	746	1,230	467	398	160
26	.....	.....	.....	1,040	2,930	3,550	1,270	721	1,180	467	383	150
27	.....	.....	.....	1,070	1,790	3,670	1,270	696	1,140	467	370	150
28	.....	.....	.....	1,010	1,640	3,000	1,270	772	1,140	438	355	140
29	.....	.....	.....	1,010	1,490	3,000	1,270	825	1,080	418	340	120
30	.....	.....	.....	952	1,490	2,830	1,190	1,740	1,020	418	325	110
31	.....	.....	.....	.....	1,710	.....	1,190	1,740	.....	398	.....	100

Daily discharge, in second-feet, of St. Mary River at Cook's ranch, Alta., near international boundary, 1902–1912—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1912.												
1				150	801	2,430	2,160	1,190	561	388	436	359
2				200	801	2,250	2,070	1,220	561	388	436	359
3				404	801	2,160	1,900	1,260	561	388	436	331
4				404	801	2,160	1,820	1,190	522	388	436	331
5				404	801	2,070	1,740	1,190	522	388	436	318
6				388	801	1,980	1,650	1,190	522	374	419	311
7				388	801	1,820	1,650	1,190	522	374	419	304
8				388	918	1,980	1,650	1,120	561	374	419	304
9				388	982	2,160	1,650	1,050	561	381	419	304
10				436	1,120	2,340	1,570	1,050	571	388	436	300
11				452	1,260	2,520	1,570	982	582	388	452	296
12				486	1,490	2,610	1,570	950	593	388	452	.....
13				545	1,570	2,700	1,570	918	604	388	470	.....
14				604	1,650	2,900	1,570	801	604	388	487	.....
15				545	1,900	2,800	1,570	801	604	388	504	.....
16				486	2,340	2,800	1,490	801	604	419	522	.....
17				561	2,800	2,520	1,420	801	561	452	486	.....
18				618	2,800	2,250	1,340	801	522	452	452	.....
19				674	2,800	2,160	1,340	801	522	463	452	.....
20				674	3,080	2,220	1,340	801	522	475	436	.....
21				674	3,480	2,280	1,420	801	522	486	436	.....
22				674	3,480	2,340	1,820	748	486	486	419	.....
23				674	3,080	2,340	1,820	748	486	504	404	.....
24				674	2,990	2,430	1 720	748	469	452	396	.....
25				723	2,800	2,520	1,620	698	452	452	388	.....
26				723	2,800	2,480	1,520	650	452	452	388	.....
27				723	2,900	2,430	1,420	650	436	452	388	.....
28				723	3,080	2,340	1,340	627	419	452	388	.....
29				723	2,900	2,250	1,340	604	419	452	388	.....
30				748	2,610	2,160	1,190	561	404	452	374	.....
31				.....	2,520	.....	1,190	561	.....	452	.....	.....

NOTE.—Stage-discharge relation affected by ice as follows: Dec. 1–31, 1902; Jan. 1 to Apr. 12, 1903; Feb. 5 to Apr. 10, 1904; Jan. 1 to Mar. 4, and Dec. 1–31, 1905; Jan. 1 to Mar. 31, 1906, 1907, and 1908; Dec. 9–31, 1908, Jan. 1 to Apr. 22, and Nov. 21 to Dec. 31, 1909; Jan. 1 to Mar. 13, 1910; Jan. 1 to Mar. 31, Nov. 10–16, and Dec. 16–31, 1911; Jan. 1 to Apr. 2, and Dec. 12–31, 1912; discharge estimated for these periods as follows: Mar. 1–4, 1905, 171 second-feet; Mar. 1–13, 1910, 180 second-feet; Dec. 12–31, 1912, 210 second-feet. Discharge for the following periods was not estimated: Dec. 1–31, 1902; Jan. 1 to Apr. 12, 1903; Jan. 1 to Mar. 31, and Dec. 9–31, 1909. For estimates of flow for other periods see tables of daily and monthly discharge.

Determination originally published for Dec. 1–31, 1902, and Jan. 1 to Apr. 12, 1903, obtained by applying an open-channel rating table; these results have been discarded and the mean monthly discharge estimated from the records of flow of St. Mary River above Swiftcurrent Creek and Swiftcurrent Creek near Babb.

The mean flow Apr. 1–12, 1903, was estimated at 200 second-feet. Jan. 1 to Feb. 4, 1904, and Dec. 9–31, 1906, ice present at gage, but open-channel rating curve assumed applicable.

June 1, 1904, to Apr. 30, 1905, daily discharge recomputed.

Dec. 14–31, 1907, gage heights missing and daily discharge estimated. Gage and cable washed out by high water June 5, and replaced July 27, 1908; determinations of discharge for this period based on results at Babb. No gage heights reported Apr. 28–30, Aug. 1 to Sept. 17, and Sept. 26 to Oct. 13, 1909; estimates for these periods not made.

Monthly discharge of St. Mary River at Cook's ranch, Alta., near international boundary, 1902–1912.

[Drainage area, 452 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1902.						
September	747	198	604	1.34	1.50	35,940
October	608	306	477	1.06	1.22	29,330
November	410	174	342	.76	.85	20,350
December	.....	.....	200	.44	.51	12,298
The period	.....	.....	.....	.....	.....	97,918

Monthly discharge of St. Mary River at Cook's ranch, Alta., near international boundary, 1902–1912—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1903.						
January	.....	.....	165	0.365	0.42	10,145
February	.....	.....	140	.310	.32	7,775
March	.....	.....	120	.265	.31	7,379
April	1,055	.....	568	1.26	1.41	33,798
May	3,060	870	1,726	3.82	4.40	106,066
June	6,175	4,075	5,200	11.50	12.82	309,421
July	4,855	1,900	2,924	6.47	7.46	179,790
August	1,900	1,105	1,404	3.11	3.59	86,329
September	2,300	710	1,109	2.45	2.73	65,990
October	1,687	575	917	2.03	2.34	56,384
November	870	365	535	1.18	1.32	31,835
December	675	288	438	.97	1.12	26,931
The year	6,175	.....	1,273	2.82	38.24	921,843
1904.						
January	288	174	224	.50	.58	13,800
February	.....	.....	200	.44	.48	11,500
March	.....	.....	200	.44	.51	12,300
April	1,555	.....	724	1.60	1.78	43,100
May	3,273	1,260	2,022	4.47	5.15	124,000
June	3,900	2,180	2,940	6.50	7.25	175,000
July	2,690	1,220	1,900	4.20	4.84	117,000
August	1,220	575	933	2.06	2.38	57,400
September	640	288	420	.929	1.04	25,000
October	288	160	221	.489	.56	13,600
November	150	110	130	.288	.32	7,740
December	242	.....	303	.670	.77	10,200
The year	3,900	.....	841	1.86	25.31	611,000
1905.						
January	.....	.....	90	.199	.229	5,534
February	.....	.....	75	.166	.173	4,165
March	210	170	188	.416	.48	11,560
April	870	180	304	.673	.75	18,090
May	1,987	640	1,215	2.69	3.10	74,710
June	3,272	1,832	2,461	5.44	6.07	146,500
July	1,987	1,315	1,642	3.63	4.18	101,000
August	1,430	515	847	1.87	2.16	52,080
September	460	288	371	.821	.916	22,080
October	1,370	325	772	.171	.197	47,470
November	545	211	298	.659	.735	17,730
December	.....	.....	240	.531	.612	14,760
The year	3,272	.....	712	1.58	21.38	515,679
1906.						
January	.....	.....	100	.221	.25	6,150
February	.....	.....	95	.210	.22	5,280
March	.....	.....	125	.277	.32	7,690
April	1,100	160	481	1.06	1.18	28,600
May	1,990	1,060	1,500	3.32	3.83	92,200
June	2,660	1,820	2,280	5.04	5.62	136,000
July	2,380	1,100	1,830	4.05	4.67	113,000
August	1,430	710	946	2.09	2.41	58,200
September	1,010	385	628	1.39	1.55	37,400
October	1,490	410	756	1.67	1.92	46,500
November	1,620	675	1,100	2.43	2.71	65,500
December	607	255	359	.794	.92	22,100
The year	2,660	.....	850	1.88	25.60	619,000
1907.						
January	.....	.....	150	.332	.38	9,220
February	.....	.....	200	.443	.46	11,100
March	.....	.....	260	.575	.66	16,000
April	685	225	489	1.08	1.20	29,100
May	3,490	590	1,930	4.27	4.92	119,000
June	5,620	3,260	4,260	9.42	10.51	253,000
July	4,830	2,010	3,120	6.90	7.96	192,000
August	2,010	830	1,330	2.94	3.39	81,800
September	1,330	1,080	1,210	2.68	2.99	72,000
October	1,040	365	567	1.25	1.44	34,900
November	365	174	244	.542	.60	14,500
December	.....	.....	157	.347	.40	9,650
The year	5,620	.....	1,170	2.59	34.91	842,000

Monthly discharge of St. Mary River at Cook's ranch, Alta., near international boundary, 1902–1912—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1908.						
January	.....	.....	105	0.232	0.27	6,460
February	.....	.....	200	.442	.48	11,500
March	.....	.....	330	.730	.84	20,300
April	1,860	225	844	1.87	2.09	50,200
May	3,720	1,340	2,490	5.51	6.35	153,000
June	18,000	2,700	6,390	14.1	15.73	380,000
July	3,050	1,180	2,490	5.51	6.35	153,000
August	1,180	528	785	1.74	2.01	48,300
September	510	425	462	1.02	1.14	27,500
October	660	365	485	1.07	1.23	29,800
November	528	410	472	1.04	1.16	28,100
December	.....	.....	200	.442	.51	12,300
The year	.....	.....	1,270	2.81	38.16	920,000
1909.						
April 23–27	1,480	700	1,190	2.63	.49	11,800
May	4,050	700	1,750	3.87	4.46	108,000
June	5,380	2,880	4,480	9.91	11.06	267,000
July	5,010	1,040	2,330	5.15	5.94	143,000
September 18–25	545	450	479	1.06	.32	7,600
October 14–31	405	275	337	.746	.50	12,000
November 1–20	828	265	593	1.31	.97	23,500
The period	.....	.....	.....	.....	.....	.....
1910.						
January	.....	.....	150	.332	.38	9,220
February	.....	.....	160	.354	.37	8,890
March	.....	.....	530	1.17	1.35	32,600
April	2,820	528	1,190	2.63	2.93	70,800
May	2,960	1,610	2,320	5.13	5.91	143,000
June	2,960	1,600	2,240	4.96	5.53	133,000
July	1,640	803	1,170	2.59	2.99	71,900
August	803	355	580	1.28	1.48	35,700
September	912	374	553	1.22	1.36	32,900
October	1,470	701	1,040	2.30	2.65	64,000
November	1,010	588	742	1.64	1.83	44,200
December	505	.....	293	.648	.75	18,000
The year	.....	.....	917	2.03	27.52	664,000
1911.						
January	.....	.....	170	.376	.43	10,500
February	.....	.....	150	.332	.35	8,330
March	.....	.....	145	.321	.37	8,920
April	1,040	177	478	1.06	1.18	28,400
May	3,810	952	2,040	4.51	5.20	125,000
June	3,890	2,380	3,470	7.68	8.57	206,000
July	2,470	1,190	1,680	3.72	4.29	103,000
August	1,740	696	1,050	2.32	2.68	64,600
September	1,440	1,020	1,260	2.79	3.11	75,000
October	992	398	621	1.37	1.58	38,200
November	446	.....	346	.765	.85	20,600
December	310	.....	195	.431	.50	12,000
The year	3,890	.....	968	2.14	29.11	701,000
1912.						
January	.....	.....	130	.288	.33	7,990
February	.....	.....	120	.265	.29	6,900
March	.....	.....	110	.243	.28	6,760
April	748	150	542	1.20	1.34	32,300
May	3,480	801	2,030	4.49	5.18	125,000
June	2,900	1,820	2,350	5.20	5.80	140,000
July	2,160	1,190	1,580	3.50	4.04	97,200
August	1,260	561	887	1.96	2.26	54,500
September	604	404	524	1.16	1.29	31,200
October	504	374	423	.936	1.08	26,000
November	522	374	432	.956	1.07	25,700
December	359	.....	249	.551	.64	15,300
The year	3,480	.....	783	1.73	23.60	569,000

NOTE.—See footnote to daily discharge table for periods when stage-discharge relation was affected by ice and discharge estimated and for periods for which the published discharge has been revised. Published monthly mean May, 1903, revised slightly to correct for error in addition.

ST. MARY RIVER NEAR KIMBALL, ALTA., NEAR INTERNATIONAL BOUNDARY.

LOCATION.—In the SW. ¼ sec. 25, T. 1, R. 25 W. fourth meridian, about 1 mile southwest of Kimball post office, 1 mile southwest of the head gates and dam of the Alberta Railway & Irrigation Co.'s canal, and 14 miles southeast of Cardston, Alta. (See Pl. II, *B*.)

DRAINAGE AREA.—472 square miles.

RECORDS AVAILABLE.—April 13, 1908, to December 31, 1917.

HISTORY.—Station was originally established in 1905, by the Alberta Railway & Irrigation Co., in the SW. ¼ sec. 25, T. 1, R. 25 W. of the fourth meridian, about half a mile above the company's head gates. It was taken over by the Irrigation Branch, Department of the Interior, Canada, in April, 1908.

Owing to lack of sufficient measurements and to the great changes in the channel and control caused by the flood of June, 1908, it has been found impossible to determine the discharge of the stream previous to June 21, 1908, although the gage heights are available for the intervening period.

The United States Geological Survey maintained a station on the St. Mary a short distance north of the international boundary, for which records of flow are available from 1902 to 1912 and are included in this report under the heading "St. Mary River at Cook's ranch, near international boundary."

In 1912 it was decided to combine these stations, provide the best possible equipment, and maintain and operate them jointly. A site was selected and a concrete gage house, equipped with a Stevens continuous water-stage recorder, was installed. This new station was used until the fall of 1916, when the formation of gravel bars made it necessary to remove the equipment to a new site about half a mile farther up stream. A new cable station was erected above the new gage house and measurements have been made from it during the season of 1917.

GAGE.—Stevens water-stage recorder in frame shelter over concrete well, with vertical staff gages inside and outside well; winter readings obtained from a chain gage attached to a traffic bridge in SW. ¼ sec. 1, T. 2, R. 25 W. fourth meridian. From 1908 to 1912 gage used was a staff in the NE. ¼ sec. 25, T. 1, R. 25 W. fourth meridian; from 1913 to 1916 the water stage recorder was in the NW. ¼ sec. 25, T. 1, R. 25 W. fourth meridian. Observer for all gages, J. M. Dunn.

DISCHARGE MEASUREMENTS.—Open-water measurements made from cable 1,500 feet above gage; winter measurements made from traffic bridge to which chain gage is attached.

CHANNEL AND CONTROL.—Banks high and rocky; not subject to overflow. Bed composed of gravel and rock. Control formed by a ledge of rock immediately below gage shelter; at high stages a gravel bar forms part of the control. Stage discharge relation permanent at low stages; likely to shift somewhat at flood stages.

EXTREMES OF DISCHARGE.—1908–1917: Maximum stage recorded, 11+ feet June 5, 1908 (discharge not determined); stage of 7.80 feet recorded June 22, 1916 (discharge, 8,620 second-feet); minimum stage, 5.42 feet February 5, 1914 (discharge, 70 second-feet). (See hydrograph, Pl. IV.)

ICE.—Stage-discharge relation affected by ice during winter.

DIVERSIONS.—Water is diverted by the United States Reclamation Service at a point near Babb, Mont., from St. Mary River to the North Branch of Milk River for the irrigation of lands in the lower Milk River valley and by the Alberta Railway & Irrigation Co. at Kimball, 1½ miles below the station.

REGULATION.—The United States Reclamation Service has under construction a large reservoir on the headwaters of Swiftcurrent Creek, but as no water has yet been stored the stream-flow records have not been affected.

ACCURACY.—Stream bed and control shifted slowly but steadily at site used from 1908 to 1912 and also at site of automatic gage and cable installed in 1913 for use of the

United States and Canada. Stage-discharge relation at new site selected for gage and cables in 1916 permanent at low stages in 1917 but slightly shifting at higher stages. Rating curves well defined between 220 and 4,840 second-feet. Open-water discharge determined by applying mean daily gage height to rating tables; winter discharge determined from hydrograph prepared from discharge measurements and by comparison of maximum and minimum temperatures and gage-height graphs. Records good.

Discharge measurements of St. Mary River near Kimball, Alta., near international boundary, 1906–1917.

Date.	Made by—	Gage height.	Discharge.
1906.		*Feet.*	*Sec.-ft.*
Sept. 22	J. F. Hamilton	.....	508
1907.			
Aug. 3	I. J. Walmsley	4.20	2,026
1908.			
June 29	H. R. Carscallen	4.13	2,788
Sept. 1	P. M. Sauder	2.45	519
16	H. R. Carscallen	2.50	579
1909.			
May 20	H. C. Ritchie	3.30	1,532
June 1	do	5.005	4,752
26	do	5.075	4,490
29	do	4.71	3,525
July 21	do	3.80	1,969
Aug. 12	do	3.40	1,389
26	do	3.00	858
Sept. 13	do	2.85	698
29	A. W. Pae	2.65	505
Nov. 1	do	2.35	305
1910.			
Apr. 9	L. J. Gleeson	2.79	644
12	do	3.01	753
22	do	3.51	1,299
25	do	3.61	1,443
May 6	do	3.67	1,584
9	do	4.26	2,506
23	do	3.93	1,912
June 6	do	4.05	2,158
20	do	4.10	2,317
July 2	do	3.75	1,764
26	F. H. Peters	3.25	1,040
Aug. 6	do	2.95	694
10	do	2.85	620
Sept. 3	N. M. Sutherland	2.53	372
9	do	2.65	453
19	do	2.86	617
22	do	2.99	735
Oct. 5	do	3.385	1,134
10	do	3.75	1,658
25	do	2.95	681
26	do	3.24	1,044
Nov. 8	do	2.88	625
Dec. 3	W. H. Greene	[a] 5.15	264
19	do	[a] 4.47	282
1911.			
Jan. 16	do	[a] 6.26	210.2
Feb. 3	do	5.53	202.4
Mar. 16	J. E. Degnan	4.95	141.6
29	do	4.63	360.3
Apr. 1	do	4.15	318.8
8	L. J. Gleeson	5.20	271.8
21	do	2.82	536.2
May 1	do	3.28	1,076.2
16	do	5.00	3,812.0
19	do	4.56	2,945.3
June 7	do	4.78	3,298.6
9	do	4.77	3,261.3
20	do	5.05	3,855.4
27	do	4.78	3,284.0
July 12	do	3.81	1,702.0
20	do	3.70	1,584.9
20	do	3.70	1,582.1
Aug. 3	L. J. Gleason	3.41	1,170.9
16	do	3.28	1,059.5
16	do	3.28	1,082.8
29	do	2.97	736.9
Sept. 7	do	3.77	1,639.7
23	do	3.65	1,428.5
Oct. 7	do	3.07	753.1
Nov. 16	do	6.30	320.6
Dec. 12	D. D. McLeod	[a] 1.51	131.9
1912.			
Jan. 4	do	3.50	123.38
21	do	3.00	203.05
Feb. 8	do	2.40	150.0
21	do	2.58	131.0
Mar. 8	do	1.86	125.64
22	do	2.30	120.69
Apr. 15	L. J. Gleeson	.65	564.5
25	do	3.00	720.6
May 4	do	3.10	791.5
11	do	3.63	1,461.3
28	do	4.59	2,754.1
June 3	do	4.22	2,175.9
19	do	4.20	2,157.7
22	do	4.28	2,331.3
July 1	do	4.20	2,225.0
3	do	4.18	2,134.8
15	V. Meek	3.78	1,489.0
22	do	3.93	1,802.3
Aug. 6	do	3.50	1,169.0
9	do	3.36	1,023.3
23	do	3.04	693.4
Sept. 14	do	2.98	628.7
Oct. 6	do	2.56	333.5
23	G. F. Deas	2.88	523.0
Nov. 1	V. Meek	2.75	421.4
16	do	2.85	505.7
20	do	2.79	376.4
Dec. 5	do	.10	255.8
23	do	2.49	210.6
1913.			
Jan. 13	do	3.16	180
24	do	2.76	94
Feb. 6	G. F. Deas	2.70	100
24	do	2.82	141
Mar. 11	do	2.95	220
Apr. 25	do	3.35	1,028
May 4	F. R. Burfield	2.65	949
19	W. A. Lamb	3.45	1,590
24	F. R. Burfield	3.96	2,260
26	do	4.58	3,042
June 5	do	6.05	5,209
9	do	5.76	5,007
13	R. R. Randell	5.74	4,750
13	W. A. Burton	5.78	4,979
27	F. R. Burfield	5.45	3,993
July 4	do	4.93	3,044
21	do	3.66	1,354
28	W. A. Lamb	3.71	1,450
Aug. 7	F. R. Burfield	3.56	1,283
20	W. A. Lamb	3.28	1,060
28	F. R. Burfield	3.04	855
Sept. 13	W. A. Lamb	2.55	550
24	L. Danielsen	2.35	468
Oct. 9	do	2.25	408

[a] Ice present.

Discharge measurements of St. Mary River near Kimball, Alta., near international boundary, 1906–1917—Continued.

Date.	Made by—	Gage height.	Discharge.
1913.		*Feet.*	*Sec.-ft.*
Oct. 14	L. Danielsen	2.55	553
24	W. A. Lamb	2.26	382
Nov. 13	L. Danielsen	2.06	344
26	J. E. Degnan	2.06	351
Dec. 5	do	a 1.86	244
16	W. A. Burton	.30	205
30	J. E. Degnan	.29	88
1914.			
Jan. 12	J. E. Degnan	3.61	214
23	do	3.20	82
Feb. 11	do	5.40	96
26	do	5.50	119
Mar. 13	W. A. Burton	5.11	229
25	O. H. Hoover	4.34	100
Apr. 7	do	2.59	295
20	do	3.00	910
May 13	do	4.10	1,952
23	W. A. Lamb	4.53	2,510
June 2	O. H. Hoover	4.63	2,718
21	W. A. Lamb	4.53	2,440
23	O. H. Hoover	4.19	2,049
July 15	do	3.77	1,591
21	W. A. Lamb	3.40	1,190
Aug. 11	O. H. Hoover	2.71	654
Sept. 2	do	2.56	588
5	do	2.49	529
10	W. A. Lamb	2.46	477
18	O. H. Hoover	2.36	470
22	do	2.97	806
Oct. 1	do	2.78	700
10	do	2.80	700
16	do	3.18	1,036
Nov. 12	do	2.89	791
26	do	2.30	422
Dec. 14	do	2.37	267
1915.			
Jan. 1	O. H. Hoover	5.04	181
19	J. E. Degnan	5.46	150
21	do	5.15	161
Feb. 8	do	5.29	120
8	do	5.29	143
10	do	5.19	112
26	do	4.78	116
27	do	4.88	117
Mar. 6	do	4.70	109
15	do	5.03	136
18	do	5.28	253
25	do	4.53	141
29	do	1.61	176
Apr. 2	do	1.88	244
3	do	1.95	255
19	V. A. Newhall	2.86	788
21	do	3.02	918
23	do	3.04	954
24	W. A. Lamb	3.06	890
May 5	V. A. Newhall	3.76	1,634
10	do	4.12	2,051
22	do	3,50	1,326
27	W. A. Lamb	3.54	1,390
June 10	V. A. Newhall	4.42	2,406
11	do	4.21	2,020
16	do	4.26	2,233
July 12	do	3.75	1,659
13	do	3.67	1,512
15	B. E. Jones	3.56	1,380
16	V. A. Newhall	3.50	1,350
Aug. 3	do	3.38	1,253
6	do	3.26	1,150
9	W. A. Lamb, J. C. Hoyt	3.20	1,001
17	V. A. Newhall	3.05	934
Oct. 7	do	2.85	909
10	do	2.80	876
Nov. 6	do	2.65	801
10	B. E. Jones, W. A. Lamb	2.59	276
19	S. H. Frame	2.33	222
Dec. 4	D. G. Chadsey	a 3.86	144
1915.			
Nov. 10	W. H. Storey	3.51	576
12	do	3.24	530
Dec. 5	do	3.37	336
8	do	3.32	317
22	do	2.93	185
24	do	2.84	141
27	do	2.85	147
1916.			
Jan. 10	W. H. Storey	4.55	149
12	do	4.53	149
Feb. 10	V. A. Newhall	5.07	230
12	do	4.97	226
Mar. 23	do	4.09	589
24	do	3.27	542
24	do	3.27	621
Apr. 5	do	3.26	543
24	do	2.66	672
25	W. A. Lamb	2.61	696
May 23	do	3.61	1,710
30	S. H. Frame	3.95	1,999
June 3	do	3.75	1,769
10	A. H. Tuttle	5.00	3,060
20	S. H. Frame	7.07	7,817
23	do	7.60	7,844
26	do	6.20	4,903
26	A. H. Tuttle	6.25	4,960
July 5	S. H. Frame	6.40	5,393
11	do	5.80	4,132
18	W. A. Lamb	5.10	3,084
26	S. H. Frame	4.16	1,817
Aug. 16	do	3.42	1,169
Sept. 4	do	3.67	1,394
8	do	4.01	1,714
26	do	2.65	578
29	do	2.56	511
Oct. 18	do	2.22	342
Nov. 17	do	4.25	440
18	W. A. Lamb	4.28	418
Dec. 11	H. W. Rowley	3.95	210
1917.			
Jan. 3	H. W. Rowley	5.57	241
22	do	5.38	118
Feb. 20	G. S. Wendon	5.76	140
Mar. 13	do	5.54	140
Apr. 2	A. W. P. Lowrie	5.69	110
7	do	6.83	651
11	do	6.37	824
12	do	5.98	597
14	do	5.53	376
May 3	do	3.11	504
7	do	3.18	562
24	do	5.50	2,750
26	do	5.96	3,290
27	do	6.08	3,570
28	do	6.20	3,730
June 14	W. A. Lamb	6.15	4,070
18	A. W. P. Lowrie	6.47	4,790
19	do	6.44	4,750
20	do	6.46	4,690
22	do	6.43	4,720
July 9	do	5.47	2,900
20	W. A. Lamb	4.85	1,870
26	A. W. P. Lowrie	4.25	1,270
Aug. 23	do	3.00	494
Sept. 14	W. A. Lamb	2.94	454
18	A. P. W. Lowrie	2.95	453
Oct. 16	do	2.80	376
Nov. 6	do	2.65	301

a Ice present.

NOTE.—Gage heights of measurements for following periods referred to water-stage recorder: May 4 to Dec. 5, 1913; Apr. 20 to Nov. 12, 1914; Mar. 29 to Nov. 12, 1915; Apr. 24 to Oct. 18, 1916; May 3 to Dec. 31, 1917. Ice present and stage-discharge relation affected by backwater Jan. 3 to Apr. 14, 1917.

Messrs. W. A. Lamb, B. E. Jones, A. H. Tuttle, R. R. Randell, and J. C. Hoyt are engineers of the United States Geological Survey.

Daily discharge, in second-feet, of St. Mary River near Kimball, Alta., near international boundary, 1908–1917.

Day.	June.	July.	Aug.	Sept.	Day.	June.	July.	Aug.	Sept.
1908.					1908.				
1	.....	2,565	1,390	575	16	.....	2,647	822	575
2	.....	2,598	1,351	535	17	.....	2,680	788	575
3	.....	2,900	1,260	545	18	.....	2,598	788	575
4	.....	2,900	1,260	505	19	.....	2,326	788	627
5	.....	2,987	1,160	446	20	.....	2,248	788	.....
6	.....	3,022	1,135	389	21	3,669	2,202	866	.....
7	.....	2,647	1,135	446	22	3,384	2,095	900	.....
8	.....	2,647	1,135	495	23	3,111	2,156	900	.....
9	.....	2,764	1,099	505	24	2,900	2,110	866	.....
10	.....	2,730	1,015	575	25	2,987	2,020	844	.....
11	.....	2,764	1,015	525	26	3,201	1,901	810	.....
12	.....	2,730	980	525	27	3,292	1,772	756	.....
13	.....	2,598	957	525	28	3,075	1,688	734	.....
14	.....	2,849	957	525	29	2,815	1,564	702	.....
15	.....	2,730	923	575	30	2,647	1,417	627	.....
					31	.....	1,390	596	.....

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1909.												
1	.....	.....	.....	.....	290	4,978	3,415	3,510	760	565	340	.....
2	.....	.....	.....	.....	680	5,985	3,797	3,047	760	565	340	.....
3	.....	.....	.....	.....	1,260	6,780	3,700	2,875	760	565	340	.....
4	.....	.....	.....	.....	1,390	6,760	3,700	2,537	760	565	565	.....
5	.....	.....	.....	.....	1,135	6,720	3,797	2,290	760	565	815	.....
6	.....	.....	.....	.....	900	6,560	3,992	2,047	760	565	870	.....
7	.....	.....	.....	.....	788	6,010	3,797	1,970	760	565	815	.....
8	.....	.....	.....	.....	900	6,120	3,605	1,820	655	565	870	.....
9	.....	.....	.....	.....	957	6,240	3,227	1,675	655	522	815	.....
10	.....	.....	.....	.....	1,135	5,420	3,047	1,530	655	480	815	.....
11	.....	.....	.....	.....	1,135	5,170	2,960	1,530	815	480	760	.....
12	.....	.....	.....	.....	1,015	4,790	2,960	1,385	760	480	655	.....
13	.....	.....	.....	.....	1,075	4,870	2,875	1,385	760	480	655	.....
14	.....	.....	.....	.....	1,135	5,355	2,790	1,315	655	480	655	.....
15	.....	.....	.....	.....	1,325	5,730	2,705	1,245	655	480	655	.....
16	.....	.....	.....	.....	1,325	6,105	2,455	1,245	655	480	655	.....
17	.....	.....	.....	.....	1,197	6,210	2,372	1,180	655	405	707	.....
18	.....	.....	.....	.....	1,260	6,480	2,455	1,115	655	405	707	.....
19	.....	.....	.....	.....	1,525	6,600	2,207	1,115	655	405	760	.....
20	.....	.....	.....	.....	1,745	7,280	2,125	990	610	405	870	.....
21	.....	.....	.....	.....	1,820	7,260	1,970	990	565	405	.....	.....
22	.....	.....	.....	.....	2,310	6,545	1,820	990	565	405	.....	.....
23	.....	.....	.....	.....	2,575	5,990	1,820	930	565	405	.....	.....
24	.....	.....	.....	.....	2,665	5,420	1,820	870	565	405	.....	.....
25	.....	.....	.....	.....	3,125	4,910	1,820	870	480	405	.....	.....
26	.....	.....	.....	575	3,522	4,490	2,047	870	480	340	.....	.....
27	.....	.....	.....	575	3,729	3,965	3,320	870	480	340	.....	.....
28	.....	.....	.....	475	4,045	3,700	6,167	870	480	340	.....	.....
29	.....	.....	.....	427	4,380	3,510	5,140	870	480	340	.....	.....
30	.....	.....	.....	475	4,380	3,415	4,290	760	522	340	.....	.....
31	.....	.....	.....	.....	4,380	.....	3,797	760	.....	307	.....	.....

Daily discharge, in second-feet, of St. Mary River near Kimball, Alta., near international boundary, 1908–1917—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1910.												
1	.....	.....	.....	575	2,085	2,985	1,655	775	335	705	910	.....
2	.....	.....	.....	575	1,915	2,800	1,655	750	350	910	800	.....
3	.....	.....	.....	500	1,750	2,765	1,580	750	370	1,125	800	.....
4	.....	.....	.....	500	1,590	2,595	1,580	740	405	1,180	795	.....
5	.....	.....	.....	500	1,535	2,320	1,520	730	425	1,150	800	.....
6	.....	.....	.....	500	1,505	2,120	1,610	695	455	1,140	800	.....
7	.....	.....	.....	575	1,655	2,120	1,565	685	470	1,140	720	.....
8	.....	.....	.....	575	2,160	2,430	1,385	665	455	1,565	625	.....
9	.....	.....	.....	575	2,520	2,360	1,325	640	455	1,640	640	.....
10	.....	.....	.....	660	2,820	2,245	1,230	610	455	1,655	740	.....
11	.....	.....	.....	750	2,820	2,245	1,190	610	465	1,655	720	.....
12	.....	.....	.....	750	2,635	2,300	1,140	610	455	1,565	710	.....
13	.....	.....	.....	870	2,450	2,550	1,150	615	445	1,445	685	.....
14	.....	.....	.....	840	2,450	2,360	1,140	610	425	1,355	665	.....
15	.....	.....	.....	840	2,265	2,245	1,150	610	435	1,230	660	.....
16	.....	.....	.....	840	2,265	2,430	1,205	585	515	1,125	720	.....
17	.....	.....	.....	840	2,085	2,430	1,220	555	650	1,065	820	.....
18	.....	.....	.....	840	1,915	2,430	1,205	540	650	1,010	800	.....
19	.....	.....	.....	940	2,085	2,360	1,180	515	625	990	775	.....
20	.....	.....	.....	1,090	2,050	2,245	1,150	485	610	980	755	.....
21	.....	.....	.....	1,325	1,915	2,070	1,115	475	610	930	750	.....
22	.....	.....	.....	1,415	1,750	2,035	1,075	465	730	810	740	.....
23	.....	.....	.....	1,300	1,900	1,900	1,035	455	740	765	720	.....
24	.....	.....	.....	1,300	2,140	1,880	1,025	490	740	710	700	.....
25	.....	.....	.....	1,445	2,500	1,705	990	470	720	710	675	.....
26	.....	.....	.....	1,815	2,800	1,520	990	410	700	930	640	.....
27	.....	.....	.....	2,140	2,800	1,590	930	400	685	990	610	.....
28	.....	.....	.....	2,450	2,800	1,740	870	385	660	1,010	545	.....
29	.....	.....	.....	2,450	2,670	1,740	810	385	635	1,045	505	.....
30	.....	.....	.....	2,265	2,800	1,740	785	370	640	1,025	495	.....
31	.....	.....	.....	.....	2,800	.....	750	345	.....	990	.....	.....
1911.												
1	220	206	194	319	1,074	2,388	2,714	1,272	684	1,030	375	308
2	219	206	188	322	1,074	3,480	2,547	1,224	722	986	405	303
3	218	202	188	287	1,108	3,793	2,404	1,212	760	986	405	299
4	216	204	183	289	1,188	4,000	2,342	1,154	1,188	954	405	301
5	213	203	181	289	1,407	3,725	2,311	1,154	2,080	922	382	291
6	215	214	178	265	1,794	3,502	2,249	1,154	1,808	880	368	282
7	214	214	169	265	1,933	3,270	2,234	1,248	1,661	840	368	289
8	210	196	159	272	1,933	3,310	2,156	1,177	1,635	760	351	290
9	203	183	161	263	1,863	3,270	2,080	1,420	1,508	734	335	288
10	194	183	136	296	1,835	3,270	1,933	1,395	1,458	734	319	[a] 236
11	[a] 194	194	131	330	1,794	3,502	1,794	1,212	1,495	704	303	[a] 184
12	[a] 203	188	131	250	1,700	3,977	1,714	1,212	1,545	734	286	[a] 132
13	213	183	136	250	1,794	4,207	1,648	1,212	1,583	713	317	140
14	213	175	136	260	1,961	4,391	1,583	1,131	1,622	770	324	140
15	213	173	133	275	2,629	4,391	1,622	1,052	1,508	734	323	140
16	212	171	142	300	3,839	4,322	1,648	1,063	1,508	684	322	149
17	212	167	131	360	3,680	4,207	1,754	1,041	1,420	641	314	149
18	213	171	145	382	3,330	4,161	1,700	975	1,395	616	288	149
19	213	178	158	398	2,891	4,000	1,622	986	1,332	598	313	149
20	213	183	181	472	2,579	3,862	1,545	986	1,260	582	311	167
21	213	183	181	607	2,435	3,702	1,520	1,041	1,272	566	309	185
22	212	185	189	722	2,404	3,545	1,495	933	1,395	574	303	140
23	210	185	186	870	2,388	3,590	1,520	880	1,495	566	300	140
24	210	188	186	912	2,358	3,702	1,520	840	1,458	566	297	[a] 134
25	210	189	165	954	2,187	4,161	1,395	810	1,420	518	298	129
26	208	[a] 190	285	1,063	2,080	3,702	1,395	820	1,296	442	295	128
27	208	192	331	1,131	1,933	3,290	1,395	830	1,272	465	318	128
28	208	192	337	1,165	1,822	3,038	1,358	780	1,308	442	365	128
29	208	.....	360	1,188	1,700	2,891	1,284	744	1,154	390	360	128
30	208	.....	351	1,063	1,648	2,891	1,395	734	1,074	405	360	128
31	208	.....	335	.....	1,794	.....	1,395	684	.....	412	.....	128

[a] Estimated.

Daily discharge, in second-feet, of St. Mary River near Kimball, Alta., near international boundary, 1908–1917—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1912.												
1	128	174	130	169	750	2,289	2,165	1,238	580	328	550	305
2	128	170	130	209	790	2,235	2,200	1,238	580	328	550	292
3	128	167	a 130	248	810	2,182	2,148	1,175	590	328	532	280
4	128	163	130	288	790	2,148	2,000	1,262	580	320	532	a 268
5	134	160	131	327	800	2,050	2,000	1,200	590	320	514	256
6	137	157	131	367	820	2,033	1,850	1,175	570	324	514	256
7	142	154	131	a 406	840	1,925	1,700	1,188	541	332	505	255
8	147	150	131	446	860	1,895	1,630	1,018	570	332	496	254
9	151	148	131	485	1,152	2,082	1,630	1,008	590	350	496	a 254
10	156	147	131	524	1,352	2,252	1,560	966	570	350	496	a 255
11	160	146	130	564	1,462	2,340	1,560	934	620	380	505	255
12	166	144	131	584	1,495	2,430	1,560	934	620	397	514	256
13	170	143	131	584	1,482	2,710	1,495	892	620	411	a 505	256
14	174	142	131	564	1,672	2,810	1,534	860	620	432	496	256
15	179	140	130	564	1,895	2,710	1,456	860	620	446	496	255
16	184	139	130	478	2,502	2,577	1,430	892	620	446	478	254
17	189	137	131	496	2,502	2,394	1,365	860	620	a 446	496	254
18	193	136	a 129	523	2,634	2,252	1,300	810	590	a 446	453	a 254
19	198	134	130	570	2,653	2,165	1,238	760	570	446	397	254
20	203	133	131	570	2,790	2,165	1,339	710	550	460	370	253
21	a 208	132	131	590	3,330	2,148	1,730	710	523	469	370	251
22	205	130	130	600	3,308	2,305	1,805	710	478	478	355	a 231
23	202	130	130	610	2,970	2,358	1,850	690	478	478	390	211
24	199	130	a 130	570	2,750	2,394	1,850	690	523	487	390	206
25	197	130	129	720	2,691	2,430	1,850	670	505	496	378	202
26	193	130	129	770	a 2,745	2,394	1,730	690	478	496	366	196
27	190	a 130	129	770	2,800	2,358	1,560	670	478	496	354	192
28	186	131	129	740	2,770	2,340	1,469	660	404	514	342	186
29	183	132	130	740	2,850	2,300	1,365	640	375	523	330	182
30	180	.....	130	720	2,870	2,165	1,300	620	365	532	318	177
31	177	.....	a 131	.....	2,358	.....	1,300	a 600	.....	a 532	.....	174
1913.												
1	202	115	135	238	1,020	5,320	3,620	1,270	816	372	416	207
2	199	110	137	250	1,004	5,380	3,530	1,260	816	368	416	298
3	196	106	148	263	980	5,350	3,340	1,310	781	364	398	312
4	193	103	160	277	968	5,340	3,060	1,320	788	398	412	291
5	190	102	172	293	950	5,260	2,860	1,310	732	398	394	256
6	187	101	186	309	932	5,220	2,710	1,290	732	402	384	249
7	184	102	200	324	920	4,940	2,620	1,270	725	402	376	249
8	183	108	210	343	932	4,970	2,520	1,360	690	407	412	246
9	185	115	216	365	944	4,950	2,450	1,530	690	407	394	242
10	187	121	218	392	902	5,020	2,360	1,690	660	398	394	252
11	187	127	219	418	986	5,210	2,360	1,580	636	425	394	232
12	183	132	219	450	1,100	5,350	2,330	1,490	600	510	402	207
13	180	137	218	500	1,210	5,060	2,220	1,430	570	550	352	224
14	181	140	216	580	1,260	4,800	2,040	1,400	530	576	360	221
15	188	142	209	700	1,260	4,600	1,810	1,360	520	560	368	197
16	182	145	198	910	1,340	4,400	1,630	1,260	515	545	394	205
17	172	146	191	1,120	1,400	4,380	1,490	1,180	500	515	394	220
18	160	145	188	1,180	1,520	4,340	1,410	1,140	505	510	394	227
19	140	145	187	1,180	1,600	4,330	1,360	1,080	520	495	389	205
20	123	143	185	1,240	1,480	4,310	1,340	1,010	535	485	384	190
21	109	142	183	1,180	1,450	4,090	1,360	964	515	452	368	172
22	101	141	180	1,170	1,570	3,460	1,390	908	525	452	352	151
23	96	140	178	1,080	1,900	3,360	1,380	879	505	448	384	122
24	95	140	177	1,070	2,270	3,240	1,360	851	452	416	356	100
25	99	140	177	1,110	2,720	3,240	1,400	844	456	430	336	96
26	128	139	180	1,110	3,190	3,520	1,610	858	407	452	319	93
27	138	137	187	1,160	3,920	3,950	1,550	844	380	452	319	92
28	137	136	196	1,130	3,950	4,250	1,460	844	380	448	274	91
29	132	.....	205	1,090	5,110	4,110	1,410	837	372	430	266	90
30	127	.....	215	1,050	5,260	3,820	1,420	830	376	430	333	87
31	121	.....	226	.....	5,240	.....	1,340	830	.....	420	.....	78

a Estimated.

Daily discharge, in second-feet, of St. Mary River near Kimball, Alta., near international boundary, 1908–1917—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1914.												
1	85	a 81	a 128	265	1,092	2,314	1,686	832	609	690	645	a 367
2	94	78	139	275	1,543	2,587	1,675	810	567	731	691	362
3	103	73	148	288	2,085	2,899	1,719	810	537	752	795	366
4	a 114	a 71	157	312	1,965	3,120	1,753	825	525	788	919	316
5	123	70	168	290	1,764	3,094	1,869	802	510	802	944	310
6	135	73	177	265	1,675	2,964	1,977	795	505	780	1,012	302
7	146	78	186	295	1,664	2,730	1,989	810	510	759	1,012	290
8	159	a 82	a 197	320	1,686	2,444	1,917	766	500	724	1,012	277
9	172	a 87	a 207	343	1,708	2,210	1,881	724	495	717	927	272
10	183	a 90	215	362	1,965	1,941	1,845	697	485	710	840	272
11	198	96	222	364	2,049	1,788	1,810	633	470	697	818	273
12	215	97	226	366	1,953	1,753	1,753	627	460	671	780	269
13	195	98	229	440	1,965	2,148	1,697	609	445	678	802	267
14	182	98	230	510	2,049	2,470	1,697	591	430	724	780	267
15	175	a 100	228	555	2,223	2,405	1,631	567	410	832	780	260
16	165	105	220	633	2,470	2,314	1,532	543	430	1,020	848	250
17	156	111	205	633	2,691	2,366	1,426	671	455	1,205	780	239
18	a 143	118	190	603	2,769	2,483	1,385	832	455	1,255	731	238
19	138	122	190	684	2,795	2,600	1,265	840	515	1,186	731	239
20	128	127	182	855	2,834	2,626	1,235	810	633	1,120	697	235
21	115	a 130	178	952	2,808	2,535	1,225	759	773	1,056	671	223
22	a 97	a 127	a 185	935	2,665	2,444	1,158	738	818	1,012	537	219
23	82	122	a 189	978	2,574	2,098	1,056	745	795	969	445	221
24	81	119	a 160	1,647	2,600	1,905	1,003	780	788	911	435	221
25	a 85	117	100	1,047	2,821	1,822	960	752	724	848	445	216
26	a 85	119	a 98	1,092	2,834	1,810	911	724	710	810	430	207
27	78	120	a 102	1,092	2,626	1,788	871	678	780	780	405	200
28	77	123	a 170	1,129	2,509	1,776	855	658	752	745	390	193
29	a 82	.....	202	1,092	2,379	1,753	855	633	724	724	375	188
30	85	.....	222	1,074	2,198	1,742	855	615	710	684	a 371	185
31	84	.....	248	.....	2,185	.....	840	609	.....	678	.....	183
1915.												
1	181	148	114	212	1,420	1,461	2,514	1,360	654	635	630	347
2	a 180	a 146	112	240	1,637	1,483	2,436	1,300	780	668	615	341
3	182	143	108	266	1,730	2,306	2,514	1,240	1,694	755	615	339
4	184	140	108	286	1,682	2,397	2,358	1,193	a 1,494	815	615	338
5	185	137	109	306	1,626	a 2,475	2,189	1,155	1,250	894	630	336
6	186	133	110	326	1,516	a 2,475	2,078	1,117	1,060	950	605	332
7	186	130	a 111	334	1,430	2,345	2,066	1,070	966	922	590	327
8	185	126	113	348	1,549	2,358	2,030	1,060	874	915	581	316
9	183	121	a 117	322	1,886	2,280	1,982	1,060	882	867	568	310
10	a 180	115	121	334	2,054	2,488	1,934	1,043	924	834	563	302
11	177	110	125	a 318	2,126	2,202	1,718	1,018	a 858	822	545	295
12	173	110	129	322	2,054	a 2,078	1,615	1,000	a 802	815	545	287
13	169	110	131	339	2,102	2,006	1,516	1,009	780	761	536	278
14	165	111	a 133	388	2,215	2,090	1,494	1,043	758	743	526	269
15	160	111	137	448	2,150	2,163	1,430	a 958	712	755	515	259
16	157	111	150	497	a 1,982	2,254	1,350	950	654	755	504	250
17	a 153	111	a 175	543	1,826	2,228	1,538	932	660	743	493	239
18	151	111	218	647	1,790	2,475	a 2,054	907	758	719	482	229
19	150	107	253	765	1,648	a 2,397	a 1,910	898	890	707	471	a 218
20	155	102	262	890	1,505	2,280	1,483	1,018	882	684	460	205
21	164	96	265	907	1,400	2,163	1,310	992	826	668	449	194
22	166	93	260	941	1,340	2,102	1,270	a 907	742	662	438	185
23	166	95	220	932	1,270	2,030	1,250	866	750	656	427	151
24	a 166	104	180	916	1,280	2,042	1,240	818	735	646	416	142
25	a 165	114	142	890	1,350	2,488	1,240	795	720	610	405	a 140
26	164	116	140	890	1,360	a 2,670	1,360	758	668	610	394	142
27	160	116	150	874	1,380	a 2,605	1,380	742	654	630	390	147
28	158	117	a 160	866	1,370	2,488	1,626	742	634	646	a 383	a 150
29	a 154	.....	165	890	1,390	2,384	1,549	728	628	668	372	155
30	151	.....	162	1,018	1,450	2,306	1,549	690	582	673	354	154
31	a 149	.....	191	.....	1,450	.....	1,410	682	.....	668	.....	153

a Estimated.

Daily discharge, in second-feet, of St. Mary River near Kimball, Alta., near international boundary, 1908–1917—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1916.												
1	150	232	185	658	1,080	1,980	6,037	1,481	964	511	300	245
2	150	221	190	658	1,165	1,960	5,848	1,433	964	483	325	235
3	152	218	205	630	1,150	1,800	5,890	1,433	1,053	469	336	245
4	153	217	240	580	1,175	1,770	5,764	1,366	1,284	455	336	245
5	154	218	300	532	1,240	2,050	5,428	1,320	1,490	442	a320	230
6	154	219	340	530	1,450	2,320	4,516	1,293	1,721	469	305	225
7	153	222	390	543	1,865	2,340	3,977	1,275	1,784	422	295	220
8	151	228	450	560	2,170	2,340	3,977	1,257	1,700	a448	325	215
9	149	230	600	a575	2,260	2,500	3,993	1,414	1,433	455	a350	210
10	149	230	700	590	2,260	2,930	4,059	1,559	1,275	442	310	210
11	149	228	850	672	2,100	3,480	4,159	1,569	1,171	422	280	210
12	149	226	800	672	1,960	3,560	4,042	1,510	1,078	378	280	210
13	149	240	650	680	1,795	3,560	4,075	1,404	996	360	280	210
14	150	300	550	700	1,680	3,640	3,763	1,284	949	360	280	210
15	154	700	510	680	1,600	4,120	3,585	1,205	925	348	290	210
16	157	1,100	512	740	1,530	5,240	3,520	1,154	880	336	340	210
17	159	900	514	650	1,440	6,420	3,407	1,154	815	342	440	210
18	165	750	516	680	1,390	6,880	3,312	1,205	759	348	418	210
19	171	650	520	650	1,390	7,660	3,101	1,171	724	378	395	210
20	178	600	524	672	1,400	7,817	2,865	1,154	675	390	355	210
21	191	550	528	690	1,495	8,520	2,656	1,129	654	410	340	210
22	208	520	532	725	1,600	8,620	2,452	1,095	619	390	340	210
23	225	480	538	672	1,690	7,844	2,327	1,053	612	378	345	215
24	241	360	541	672	1,805	5,890	2,156	1,020	612	348	342	215
25	255	290	615	696	1,990	4,966	2,016	988	592	348	333	215
26	260	240	618	660	2,100	4,987	1,870	1,061	578	330	323	220
27	261	210	620	660	2,140	5,113	1,859	1,053	558	342	312	220
28	260	185	620	740	2,030	5,470	1,805	1,037	544	330	296	225
29	256	180	615	810	1,960	6,520	1,710	1,020	519	330	278	230
30	250	.....	615	945	1,999	6,730	1,639	1,004	490	a330	260	235
31	242	.....	620	.....	2,000	.....	1,539	988	.....	336	.....	237
1917.												
1	a239	100	132	110	490	3,470	3,130	837	332	415	284	190
2	241	100	131	110	495	3,350	3,100	772	294	415	315	180
3	240	102	130	110	504	3,280	2,970	708	268	415	315	165
4	240	103	130	250	498	3,140	3,060	672	253	410	340	145
5	240	104	130	375	530	3,080	3,020	610	247	410	315	140
6	240	106	130	530	a550	3,050	a3,040	560	236	443	298	140
7	a240	108	130	650	570	3,180	3,060	538	230	437	294	135
8	240	112	131	690	660	3,520	2,990	538	222	448	290	130
9	240	120	133	735	818	3,880	2,830	546	250	459	284	130
10	239	128	135	780	1,110	4,610	2,850	551	318	426	277	125
11	235	134	a138	824	1,410	5,200	2,730	560	318	400	274	a120
12	227	136	140	597	1,660	5,090	2,680	515	386	405	268	120
13	214	140	140	485	2,050	4,940	2,600	470	458	400	256	a115
14	194	150	140	376	2,500	4,600	2,530	458	470	395	239	115
15	170	155	140	372	2,850	4,410	2,330	434	462	380	237	115
16	150	160	140	370	3,040	4,430	2,160	434	454	360	236	a120
17	140	160	140	372	3,220	4,690	2,100	430	450	340	226	a125
18	132	155	a140	374	3,200	4,760	2,100	426	450	355	225	130
19	124	146	140	384	3,170	4,760	2,160	430	450	355	224	140
20	120	140	140	410	3,220	4,740	1,890	438	450	375	221	150
21	120	140	138	438	3,140	4,760	1,850	452	442	426	217	a155
22	120	140	137	a450	2,890	4,690	1,820	466	442	443	212	160
23	120	139	134	460	2,640	4,510	1,720	470	430	410	208	a170
24	123	138	130	466	2,510	4,240	1,570	462	470	390	204	180
25	128	136	128	472	2,780	4,140	1,440	446	458	365	201	a190
26	128	134	125	477	3,380	4,100	1,320	418	450	325	197	200
27	120	132	122	a481	3,560	3,940	1,210	390	458	290	197	215
28	112	132	120	481	3,740	3,820	1,130	378	442	256	197	230
29	105	.....	117	482	a3,840	3,510	1,090	354	434	253	197	a250
30	100	.....	115	485	3,950	3,240	1,010	318	430	262	197	320
31	100	.....	111	.....	3,680	.....	928	340	.....	268	.....	400

a Estimated.

NOTE.—Highest stage in 1908 was June 5, when the maximum gage height exceeded 11 feet. On account of changing conditions during the flood of 1908 the rating table could not be applied to gage heights previous to June 21, 1908. Shifting control Nov. 17–29, 1912, and June 9–13, 1917.

Stage-discharge relation affected by ice during the following periods: Nov. 24–30, 1910, Jan. 1 to Apr. 17 and Nov. 8 to Dec. 31, 1911; Nov. 25 to Dec. 31, 1912; Jan. 1 to Apr. 16 and Dec. 16–31, 1913; Jan. 1 to Mar. 28 and Nov. 15 to Dec. 31, 1915; Jan. 1 to Feb. 19, Feb. 27 to Mar. 14, and Nov. 11 to Dec. 31, 1916; Jan. 1 to May 5 and Dec. 1–31, 1917.

Discharge determined from readings on chain gage at bridge in SW. ¼ sec. 1, T. 2, R. 25, Jan. 1 to May 5, 1917, from water-stage recorder May 7–26 and June 2–Sept. 30, and from staff gage in SW. ¼ sec. 25, T. 1, R. 25, May 27 to June 1, 1917.

Monthly discharge of St. Mary River near Kimball, Alta., near international boundary, 1908–1917.

[Drainage area, 472 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1908.						
June 21–30	3,669	2,647	3,108.1	6.585	2.449	61,648
July	3,022	1,390	2,395.0	5.074	5.850	147,265
August	1,390	596	946.7	2.006	2.313	58,210
September 1–19	627	389	528.6	1.120	.791	19,921
The period					11.403	287,044
1909.						
April 26–30	575	427	505.4	1.078	.200	5,012
May	4,380	290	1,906.5	4.039	4.657	117,225
June	7,280	3,415	5,645.6	11.961	13.335	335,936
July	6,167	1,820	3,096.5	6.560	7.563	190,397
August	3,510	760	1,466.3	3.107	3.582	90,160
September	815	480	644.7	1.366	1.524	38,362
October	565	307	453.3	.960	1.107	27,872
November 1–20	870	340	683.2	1.447	1.076	27,102
The period					33.044	832,066
1910.						
April	2,450	500	1,068	2.26	2.525	63,550
May	2,820	1,505	2,206	4.69	5.407	135,642
June	2,985	1,520	2,208	4.68	5.219	131,382
July	1,655	750	1,176	2.49	2.873	72,312
August	775	345	562	1.19	1.373	34,556
September	740	335	544	1.15	1.286	32,370
October	1,655	705	1,114	2.36	2.721	68,498
November	910	495	711	1.50	1.675	42,307
The period					23.079	580,617
1911.						
January	220	194	210	.44	.51	12,937
February	214	167	189	.40	.42	10,508
March	360	131	196	.41	.47	12,034
April	1,188	250	527	1.12	1.25	31,376
May	3,839	1,074	2,070	4.38	5.05	127,249
June	4,391	2,388	3,651	7.74	8.64	217,269
July	2,714	1,284	1,783	3.77	4.35	109,630
August	1,420	684	1,044	2.21	2.55	64,217
September	2,080	684	1,377	2.92	3.26	81,949
October	1,030	390	676	1.43	1.65	41,547
November	405	286	334	.70	.78	19,874
December	308	128	190	.40	.46	11,664
The year					29.39	740,254
1912.						
January	208	128	171	.362	.42	10,514
February	174	130	143	.303	.33	8,225
March	131	129	130	.275	.32	7,993
April	770	169	527	1.120	1.25	31,359
May	3,330	750	1,984	4.200	4.84	121,992
June	2,810	1,895	2,295	4.860	5.42	136,562
July	2,200	1,238	1,644	3.480	4.01	101,084
August	1,262	600	882	1.870	2.16	54,232
September	620	365	547	1.160	1.29	32,549
October	532	320	423	.896	1.03	26,009
November	550	318	450	.953	1.06	26,777
December	305	174	240	.508	.59	14,757
The year					22.72	572,053

Monthly discharge of St. Mary River near Kimball, Alta., near international boundary, 1908–1917—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1913.						
January	202	95	158	0.335	0.386	9,715
February	146	101	129	.273	.284	7,164
March	226	135	191	.405	.467	11,744
April	1,240	238	749	1.587	1.771	44,569
May	5,260	902	1,912	4.051	4.671	117,564
June	5,380	3,240	4,519	9.574	10.681	268,900
July	3,620	1,340	2,024	4.288	4.944	124,450
August	1,690	830	1,162	2.462	2.838	71,448
September	816	372	574	1.217	1.358	34,155
October	576	364	448	.949	1.094	27,548
November	416	266	371	.786	.877	22,076
December	312	78	190	.403	.465	11,683
The year					29.836	751,016
1914.						
January	215	77	128	.271	.31	7,870
February	130	70	101	.214	.22	5,609
March	248	98	184	.390	.45	11,314
April	1,129	265	637	1.350	1.51	37,904
May	2,834	1,092	2,230	4.725	5.45	137,120
June	3,120	1,742	2,331	4.939	5.51	138,700
July	1,989	840	1,430	3.030	3.49	87,930
August	840	543	719	1.523	1.76	44,210
September	818	410	584	1.237	1.38	34,750
October	1,255	671	841	1.782	2.05	51,711
November	1,012	371	702	1.488	1.66	41,772
December	367	183	256	.542	.62	15,741
The year					24.40	614,631
1915.						
January	186	149	168	.356	.41	10,330
February	148	93	117	.248	.26	6,498
March	265	108	157	.333	.38	9,654
April	1,018	212	575	1.220	1.36	34,215
May	2,215	1,270	1,645	3.490	4.02	101,145
June	2,670	1,461	2,251	4.770	5.32	133,940
July	2,514	1,240	1,722	3.648	4.21	105,882
August	1,360	682	969	2.053	2.37	59,581
September	1,694	582	842	1.784	1.99	50,102
October	950	610	739	1.570	1.81	45,439
November	630	354	504	1.070	1.19	29,990
December	347	140	243	.515	.59	14,941
The year					23.91	601,717
1916.						
January	261	149	185	.392	.45	11,375
February	1,100	180	377	.799	.86	21,685
March	850	185	516	1.090	1.26	31,728
April	945	530	664	1.410	1.57	39,511
May	2,260	1,080	1,707	3.620	4.17	104,958
June	8,620	1,770	4,634	9.820	10.96	275,742
July	6,037	1,539	3,463	7.340	8.46	212,932
August	1,569	988	1,229	2.600	3.00	75,568
September	1,784	490	947	2.010	2.24	56,350
October	511	330	391	.828	.95	24,042
November	440	260	324	.686	.77	19,279
December	245	210	220	.466	.54	13,527
The year					35.23	886,697
1917.						
January	241	100	174			10,699
February	160	100	130			7,220
March	140	111	132			8,116
April	824	110	453			26,955
May	3,950	490	2,215			136,195
June	5,200	3,050	4,104			244,205
July	3,130	928	2,207			135,703
August	837	318	497			30,559
September	470	222	382			22,731
October	459	253	378			23,242
November	340	197	248			14,757
December	400	115	168			10,330
The year						670,712

As a part of the discharge of St. Mary River was diverted by the United States Reclamation Service in 1917 the run-off per square mile and depth in inches on drainage area have not been computed.

Mean monthly discharge, in second-feet, of St. Mary River at international boundary 1902–1917.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total (acre-feet).
1902	.....	.....	.....	.....	.....	.....	.....	.....	604	477	342	a240	b100,377
1903	a155	a163	a241	a628	1,720	5,200	2,924	1,404	1,109	917	535	438	933,211
1904	224	c200	c200	724	2,022	2,940	1,900	933	420	221	130	c166	610,600
1905	c90	c75	c188	304	1,215	2,461	1,642	847	371	772	298	c240	515,700
1906	c100	c95	c125	481	1,500	2,280	1,830	946	628	756	1,100	359	619,000
1907	c150	c200	c260	489	1,930	4,260	3,120	1,330	1,210	567	244	157	842,660
1908	c105	c200	c330	844	2,490	6,390	2,490	785	462	485	472	c200	920,000
1909	a155	a163	a241	a628	1,907	5,646	3,097	1,466	645	453	683	a240	926,313
1910	c150	c160	c530	1,190	2,320	2,240	1,170	580	553	1,040	742	293	664,000
1911	210	189	196	527	2,070	3,651	1,783	1,044	1,377	676	334	190	740,254
1912	171	143	130	527	1,984	2,295	1,644	882	547	423	450	240	571,741
1913	158	129	191	749	1,912	4,519	2,024	1,162	574	448	371	190	749,112
1914	128	101	184	637	2,230	2,331	1,430	719	584	841	702	256	614,631
1915	168	117	157	575	1,645	2,251	1,722	969	842	739	504	243	585,988
1916	185	377	516	664	1,707	4,634	3,463	1,229	947	391	324	220	885,780
1917	174	130	132	453	2,215	4,104	2,207	497	382	378	248	168	670,706
Average	155	163	241	628	1,924	3,680	2,163	986	703	599	467	240	723,269
Average run-off, acre-feet	9,531	9,133	14,819	37,369	118,302	218,980	132,996	60,627	41,831	36,831	27,788	14,757	722,964
Average annual run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,532

a Taken as average of same months in other years to complete year.
b Partial record not included in average.
c Discharge estimated.

NOTE.—Table summarizes stream-flow data for St. Mary River where it crosses international boundary prepared from records obtained by the United States at gaging station formerly maintained near the boundary, from records obtained by the Canadian Government at gaging station formerly maintained near Kimball, Alta., and from recent records obtained at the station jointly maintained near Kimball by representatives of the two Governments.

During the year 1917 water was diverted from St. Mary River at a point about half a mile below the outlet of Lower St. Mary Lake by the United States Reclamation Service St. Mary canal. This water, less the quantity lost by seepage, was delivered to the North Fork of Milk River. A large proportion of the seepage waters returned to St. Mary River, either above the station near the international boundary or by way of Rolph (Willow) Creek at a point between that station and the one near Lethbridge. The following table shows the water diverted from the St. Mary River drainage by the United States Reclamation Service St. Mary canal, exclusive of seepage losses from the canal:

Month.	Water diverted.	
	Sec.-ft.	*Acre-ft.*
July 3–31	218	12,500
August	254	15,600
Sept. 1–13	215	5,540
The period	.....	33,600

Duration of flow (number of days in the year) of St. Mary River near international boundary, 1909–1917.

Flow (second-feet).	1909	1910	1911	1912	1913	1914	1915	1916	1917	Total.	Average.
8,000	.....	.....	.....	.....	.....	.....	.....	2	.....	2	.....
7,000	2	.....	.....	.....	.....	.....	.....	5	.....	7	1
6,000	15	.....	.....	.....	.....	.....	.....	10	.....	25	3
5,000	23	.....	.....	.....	13	.....	.....	18	2	56	5
4,000	33	.....	9	.....	26	.....	.....	26	17	111	12
3,000	44	.....	30	2	40	2	.....	39	48	205	23
2,000	72	47	52	49	52	40	43	59	68	482	54
1,900	78	52	57	50	53	49	49	65	68	521	58
1,800	80	54	61	57	54	55	51	71	71	554	62
1,700	81	60	71	60	54	66	54	77	72	595	65
1,600	82	67	79	63	57	74	61	82	73	638	71
1,500	85	78	89	68	63	76	68	87	74	688	76
1,400	85	81	98	75	75	77	78	98	76	743	81
1,300	91	87	110	82	88	78	90	102	77	805	89
1,200	95	92	121	87	97	83	98	105	78	856	95
1,100	103	106	133	91	109	87	101	121	81	902	100
1,000	105	115	143	93	117	102	112	132	82	1,001	111
900	112	127	153	96	129	112	127	141	83	1,070	119
800	126	142	161	107	140	136	153	146	86	1,197	133
700	142	171	175	120	146	173	172	155	90	1,344	149
600	155	199	181	138	151	199	202	188	95	1,508	165
500	172	216	188	179	165	213	214	214	108	1,669	185
400	196	236	197	212	196	219	225	230	172	1,983	220
300	205	243	235	241	234	244	250	276	203	2,131	237
200	206	243	294	271	275	284	270	311	255	2,409	265
100	206	243	365	366	355	338	362	365	365	2,965	329
50	206	243	365	366	365	365	365	365	365	3,005	334

ST. MARY RIVER NEAR LETHBRIDGE, ALTA.[1]

LOCATION.—In the NE. ¼ sec. 26, T. 7, R. 22 W. fourth meridian, 8 miles southwest of the city of Lethbridge and 4 miles above confluence with Oldman River.

DRAINAGE AREA.—1,394 square miles.

RECORDS AVAILABLE.—October 13, 1911, to December 31, 1917.

GAGE.—Stevens continuous water-stage recorder installed June 8, 1916; prior to that date a vertical staff graduated to hundredths of a foot; winter readings still obtained from the vertical staff. Staff gage read by W. D. Whitney.

DISCHARGE MEASUREMENTS.—Made from cable 1,680 feet downstream from gage.

CHANNEL AND CONTROL.—Bed composed of coarse gravel. Right bank low and subject to overflow at flood stages; left bank high and not subject to overflow. Control is a large gravel bar and is likely to shift during floods.

EXTREMES OF DISCHARGE.—1911–1917: Maximum stage recorded, 3.91 feet June 22, 1916 (discharge, 8,964 second-feet); minimum stage recorded, 0.15 foot, October 5, 1913 (discharge, 46 second-feet). (See hydrograph, Pl. V.)

ICE.—Stage-discharge relation affected by ice during winter season.

DIVERSIONS.—The United States Reclamation Service and the Alberta Railway & Irrigation Co. divert water from the river for irrigation above this station.

ACCURACY.—Stage-discharge relation permanent during open-water periods 1916 and 1917; fairly permanent 1911 to 1914; control shifted in 1915. Staff gage read daily to hundredths 1911 to June 7, 1916, and during winter periods. Operation of water-stage recorder not completely satisfactory throughout open-water season of 1917, as shown by breaks in record. Daily discharge for open-water periods obtained by applying mean daily gage height to rating table; discharge for periods in which record was broken obtained by comparison with records obtained from stations on St. Mary River near international boundary; winter discharge ascertained from hydrograph based on daily gage heights, discharge measurements, and records of temperature. Records fair.

[1] Formerly called "St. Mary River at Whitney's ranch."

Discharge measurements of St. Mary River near Lethbridge, Alta., 1911–1917.

Date.	Made by—	Gage height.	Discharge.
1911.		*Feet.*	*Sec.-ft.*
Oct. 28	N. M. Sutherland	0.53	561.40
Nov. 29	D. D. McLeod	.73	297.84
Dec. 15	do	.50	199.34
1912.			
Jan. 12	do	1.49	235.43
30	do	1.56	196.08
Feb. 15	do	1.35	174.55
Mar. 1	do	1.20	151.47
20	do	1.20	98.34
Apr. 17	N. McL. Sutherland	.63	821.80
May 15	A. W. P. Lowrie	1.12	1,940.00
June 8	do	1.03	1,637.24
29	do	1.08	1,814.00
July 14	do	.93	1,380.86
Aug. 9	do	.64	865.39
30	do	.33	451.54
Sept. 21	do	.21	369.84
Oct. 11	do	.35	478.00
30	do	.44	565.00
Nov. 25	V. Meek	.44	454.50
Dec. 10	do	.31	283.54
31	do	.49	157.00
1913.			
Jan. 18	do	1.00	67
Feb. 12	G. F. Deas	1.19	111
28	do	1.12	119
Mar. 31	do	.90	353
Apr. 19	H. O. Brown	.85	1,275
May 12	R. Palmer	.76	1,099
June 3	do	2.25	5,671
21	do	1.58	3,001
July 9	do	1.31	2,233
28	do	.95	1,367
Aug. 19	do	.74	934
Sept. 3	do	.47	584
19	do	.25	291
Oct. 7	do	.09	201
Nov. 1	do	.54	421
Dec. 2	J. E. Degnan	.51	283
12	do	.31	261
23	do	.04	63
1914.			
Jan. 9	do	1.43	252
20	do	1.43	204
Feb. 5	do	1.41	57
Mar. 5	do	1.91	248
Apr. 3	J. E. Caughey	1.36	496
23	do	1.73	1,080
May 11	do	2.12	1,841
30	do	2.09	1,912
June 20	do	2.14	2,083
July 7	do	1.89	1,341
21	do	1.52	671
Aug. 4	do	1.43	577
19	do	1.41	579
Sept. 1	do	1.15	360
19	do	1.00	218
Oct. 1	do	1.30	459
21	do	1.86	1,415
Nov. 10	O. H. Hoover	1.72	1,006
24	do	1.43	622
Dec. 9	do	1.46	148
29	do	2.02	236
1915.		*Feet.*	*Sec.-ft.*
Jan. 12	O. H. Hoover	1.84	177
27	J. E. Degnan	1.89	195
Feb. 12	do	2.20	185
Mar. 3	do	2.14	138
18	P. H. Daniells	2.42	1,969
Apr. 3	do	1.33	497
15	do	1.29	509
30	do	1.60	884
May 13	W. R. McCaffrey	2.06	1,882
27	do	1.82	1,238
June 8	do	2.33	2,762
22	do	2.23	2,346
27	J. E. Degnan	2.57	3,642
29	do	2.37	2,885
July 13	W. R. McCaffrey	1.97	1,711
23	do	1.80	1,283
Aug. 11	G. H. Whyte-McCaffrey	1.67	1,046
24	W. R. McCaffrey	1.65	1,064
Sept. 21	do	1.57	989
Oct. 8	W. H. Hannon	1.72	1,236
27	W. R. McCaffrey	1.46	783
Nov. 22	W. H. Storey	1.45	686
Dec. 15	do	1.52	259
1916.			
Jan. 5	do	[a] 1.84	148
Feb. 2	V. A. Newhall	[a] 1.96	153
21	H. W. Rowley	2.22	2,072
Mar. 10	do	2.16	1,659
27	J. M. Paul	1.45	866
Apr. 28	do	1.44	886
May 17	W. M. Edwards	1.85	1,561
June 15	do	2.77	3,865
22	J. E. Degnan	3.97	8,887
24	do	3.66	7,889
27	do	3.38	6,687
July 17	W. M. Edwards	2.60	3,370
Aug. 14	do	1.84	1,377
Sept. 11	do	1.80	1,319
Oct. 6	J. R. Estey	1.27	571
21	E. J. Switzer	1.17	478
Nov. 14	W. M. Edwards	[a] 1.29	227
Dec. 7	H. W. Rowley	[a] 1.06	163
28	do	[a] 1.54	179
1917.			
Jan. 18	do	[a] 1.92	168
Feb. 14	W. A. Burton	[a] 2.25	[b]230
27	G. S. Wenden	[a] 2.22	183
Mar. 20	A. W. P. Lowrie	[a] 2.09	169
Apr. 21	do	[c] 1.28	843
May 14	do	2.27	2,787
June 8	do	2.41	[c]3,291
27	do	2.65	4,048
July 18	do	1.93	1,728
31	do	1.36	737
Aug. 18	do	.58	208
Sept. 10	do	.50	200
29	do	.65	293
Nov. 3	do	.85	427
24	S. H. Frame	.66	208
Dec. 12	do	[a] .86	148
28	do	[a] 1.69	234

[a] Ice present. [b] Discharge estimated from field inspection. [c] Strong upstream wind.

Daily discharge, in second-feet, of St. Mary River near Lethbridge, Alta., 1911–1917.

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1911.				1911.				1911.			
1	.....	435	325	11	.....	305	285	21	554	1,570	232
2	.....	435	325	12	.....	305	200	22	554	1,330	237
3	.....	520	320	13	435	305	200	23	554	935	247
4	.....	520	314	14	578	770	200	24	554	850	248
5	.....	520	307	15	578	770	200	25	554	695	244
6	.....	435	301	16	578	1,570	205	26	554	665	235
7	.....	520	300	17	554	1,570	211	27	554	535	237
8	.....	305	305	18	435	1,710	218	28	554	420	225
9	.....	305	307	19	554	1,110	226	29	520	295	211
10	.....	305	306	20	554	1,570	230	30	520	325	203
								31	435	.....	197

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1912.												
1	195	195	151	.....	1,132	2,098	1,881	1,794	512	325	578	415
2	195	194	148	.....	1,198	1,974	1,881	1,522	512	311	589	405
3	195	193	146	.....	1,220	1,974	1,822	1,286	494	302	589	390
4	195	192	149	[a]1,074	1,220	1,912	1,794	1,242	503	308	566	365
5	198	192	152	930	1,176	1,881	1,794	1,198	503	444	554	350
6	203	191	136	898	1,242	1,881	1,794	1,056	494	416	520	340
7	210	190	136	930	1,522	1,850	1,794	1,002	494	409	503	320
8	219	190	145	930	1,598	1,794	1,794	898	486	409	486	310
9	227	188	145	948	1,654	1,626	1,794	834	478	409	486	285
10	231	186	144	930	1,710	1,626	1,881	756	452	444	486	290
11	233	184	143	930	1,710	2,534	1,881	743	452	478	512	285
12	235	182	142	898	1,794	2,636	1,943	743	460	486	532	280
13	237	179	140	898	1,974	2,772	1,881	730	452	486	554	275
14	238	177	137	930	2,067	2,772	1,402	730	452	486	648	305
15	240	175	134	930	2,129	2,840	1,522	703	444	478	635	330
16	242	173	133	930	2,296	1,850	1,286	703	444	469	648	320
17	244	172	135	984	2,466	1,794	1,154	689	435	444	648	300
18	245	170	136	1,002	2,738	1,766	1,132	676	435	444	589	270
19	245	169	136	930	2,670	1,766	1,110	662	416	444	566	250
20	244	167	135	898	2,670	1,738	1,074	662	409	486	520	240
21	242	166	136	898	2,568	1,738	1,074	612	402	532	480	235
22	235	165	142	898	2,432	1,682	1,074	566	383	589	445	220
23	220	164	155	930	2,398	2,129	1,154	532	376	589	430	210
24	215	163	175	966	2,262	2,129	1,242	503	370	589	440	200
25	211	162	197	966	2,296	2,067	1,286	503	365	589	450	195
26	208	160	[a]240	1,020	2,262	1,794	2,432	503	365	589	460	190
27	204	157	.....	1,020	2,262	3,190	3,470	503	360	589	465	180
28	200	155	.....	1,020	2,228	2,466	2,432	494	355	589	455	175
29	198	153	.....	1,056	2,129	1,943	2,432	469	350	578	445	150
30	196	.....	.....	1,074	2,160	2,005	2,098	460	350	566	420	170
31	195	.....	.....	.....	2,098	.....	2,098	460	.....	566	.....	160

[a] Gage carried out; replaced Apr. 4.

Daily discharge, in second-feet, of St. Mary River near Lethbridge, Alta., 1911–1917—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1913.												
1	140	62	112	460	1,200	5,670	3,558	1,110	560	130	490	289
2	130	64	107	570	1,200	5,670	3,382	1,059	574	85	490	283
3	128	67	113	680	1,290	5,934	3,382	1,059	588	65	490	274
4	125	75	120	790	1,290	3,802	2,886	1,200	560	65	430	266
5	118	85	114	900	1,200	5,582	2,822	1,350	518	46	430	261
6	111	90	114	1,025	1,200	5,362	2,730	1,110	490	85	382	261
7	85	90	115	1,110	1,110	5,362	2,580	1,110	430	184	370	265
8	94	91	138	1,390	1,110	5,362	2,490	1,110	430	190	370	267
9	102	99	162	1,200	1,110	5,142	2,238	1,110	430	190	370	268
10	82	104	164	1,290	1,110	4,926	2,210	1,110	370	230	370	267
11	68	108	175	1,290	1,025	4,926	2,132	1,110	370	320	370	265
12	65	111	186	1,600	1,025	4,716	2,080	1,110	370	430	370	261
13	69	116	200	1,600	1,025	4,510	1,830	1,110	370	560	370	252
14	75	123	210	1,600	1,110	4,310	1,710	1,110	350	765	370	241
15	62	128	194	1,390	1,200	4,114	1,600	1,110	350	750	370	228
16	65	133	180	1,290	1,290	3,924	1,600	1,076	350	735	370	250
17	67	123	190	1,290	1,490	3,738	1,556	1,076	320	795	375	245
18	67	119	212	1,200	1,600	3,558	1,290	1,025	320	780	405	220
19	70	124	225	1,200	1,710	3,382	1,200	940	270	690	405	180
20	77	128	205	1,290	1,854	3,212	1,110	860	270	675	365	164
21	88	130	217	1,390	1,950	3,046	1,110	780	254	660	335	125
22	92	124	232	1,600	1,950	2,886	1,110	780	230	645	322	85
23	95	112	244	1,600	1,950	2,886	1,110	735	190	560	315	63
24	100	120	260	1,490	2,002	2,730	1,110	705	190	532	308	69
25	95	125	252	1,290	2,210	2,730	1,110	705	190	518	305	75
26	89	129	245	1,200	2,640	2,886	1,110	705	179	504	303	85
27	83	126	252	1,200	3,280	2,886	1,200	630	178	560	302	98
28	77	119	297	1,200	4,590	3,046	1,390	630	160	546	300	111
29	65	.....	320	1,290	5,450	3,212	1,390	560	160	532	298	127
30	68	.....	336	1,290	5,450	3,382	1,390	560	160	518	296	145
31	65	.....	353	.....	5,450	.....	1,200	560	.....	504	.....	130
1914.												
1	115	108	235	608	1,538	1,855	1,264	363	335	460	820	370
2	142	83	238	520	1,607	1,855	1,161	363	335	460	820	320
3	171	58	242	530	1,607	1,855	1,066	668	293	460	905	285
4	196	56	248	560	1,607	1,855	1,066	668	293	560	905	250
5	220	57	248	510	1,680	1,855	1,066	500	293	560	905	220
6	200	63	254	550	1,584	1,980	1,161	451	293	620	905	195
7	230	68	263	530	1,515	1,930	1,161	363	258	680	905	175
8	243	82	272	596	1,515	1,855	1,492	349	258	680	1,028	160
9	252	88	280	490	1,446	1,855	1,492	293	258	905	1,085	148
10	244	94	290	415	1,655	1,930	1,607	293	265	1,085	1,085	133
11	232	96	302	388	1,930	1,955	1,705	258	300	1,400	1,085	130
12	230	85	313	406	1,730	1,855	1,492	223	300	1,400	1,180	135
13	239	83	327	480	1,680	1,855	1,268	223	265	1,400	1,180	140
14	245	87	342	540	1,680	1,805	1,161	188	265	1,400	1,224	142
15	240	93	356	632	1,655	1,855	1,161	154	265	1,492	1,165	148
16	232	108	373	694	1,655	1,855	1,161	154	265	1,492	1,115	153
17	222	155	391	722	1,855	1,980	1,066	154	237	1,492	1,065	162
18	215	176	408	820	1,855	1,980	1,066	154	230	1,630	1,015	170
19	208	178	433	888	1,980	1,980	1,066	572	230	1,630	970	176
20	204	168	460	956	2,105	2,055	973	510	265	1,515	955	185
21	190	167	442	1,009	2,184	1,980	806	460	265	1,356	975	195
22	187	176	356	1,028	2,238	1,855	668	460	300	1,246	990	212
23	184	194	342	1,047	2,238	1,755	668	510	335	1,180	820	227
24	180	203	272	1,066	2,373	1,492	632	560	335	1,180	500	233
25	177	212	202	1,161	2,373	1,492	632	530	415	1,085	500	234
26	168	218	195	1,161	2,238	1,492	500	530	460	1,085	560	230
27	140	224	342	1,224	2,105	1,492	500	460	460	1,085	560	229
28	100	230	397	1,246	1,980	1,378	480	460	510	990	560	230
29	99	.....	460	1,400	1,955	1,378	451	406	510	905	480	236
30	102	.....	540	1,469	1,955	1,378	406	363	460	820	417	236
31	112	.....	596	.....	1,855	.....	363	335	.....	820	.....	236

Daily discharge, in second-feet, of St. Mary River near Lethbridge, Alta., 1911–1917—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1915.												
1	235	181	155	569	990	1,446	2,963	1,912	756	616	802	550
2	230	182	146	525	1,080	1,468	2,635	1,652	742	588	802	522
3	220	181	138	534	1,080	1,704	2,707	1,424	770	588	802	500
4	200	176	140	605	1,730	5,220	2,530	1,320	802	616	756	480
5	181	184	157	605	1,730	3,770	2,394	1,220	1,330	616	786	455
6	163	195	176	545	1,730	4,130	2,140	1,200	1,764	866	802	425
7	165	199	207	501	1,600	3,076	2,140	1,140	1,230	1,136	818	400
8	172	200	226	534	1,600	2,815	2,110	1,140	1,064	1,230	818	380
9	178	203	252	490	1,678	2,600	2,080	1,100	962	1,230	818	355
10	180	212	283	468	1,860	2,460	2,020	1,080	930	1,190	818	328
11	179	205	324	468	1,860	2,427	1,912	1,026	962	1,210	802	313
12	178	183	375	468	1,938	2,427	1,834	995	962	1,250	802	295
13	175	164	420	468	1,886	2,328	1,912	952	930	1,250	786	279
14	172	178	590	468	2,295	2,233	1,578	925	930	1,250	770	266
15	167	191	790	479	2,394	2,671	1,512	934	882	1,136	742	259
16	169	198	1,120	569	2,635	2,926	1,512	943	818	1,136	742	263
17	157	203	1,500	593	2,926	2,743	1,424	952	786	1,118	742	274
18	150	207	1,970	675	2,600	2,565	1,490	961	756	1,046	742	285
19	170	208	1,970	717	2,427	2,565	1,652	950	728	1,046	756	300
20	176	202	1,980	820	2,140	2,926	1,534	928	802	962	742	310
21	170	190	1,990	900	2,050	2,565	1,424	935	978	882	705	317
22	168	178	1,600	990	1,600	2,394	1,360	975	930	866	685	318
23	170	175	1,730	1,080	1,490	2,328	1,280	1,000	898	834	678	316
24	180	173	1,730	1,062	1,380	2,233	1,120	1,064	850	818	672	302
25	190	171	1,600	1,062	1,380	2,140	1,100	1,028	866	802	666	288
26	195	168	1,380	990	1,380	3,730	1,140	962	866	802	657	272
27	195	163	1,200	990	1,320	3,690	1,424	882	818	786	647	255
28	186	158	1,080	990	1,280	3,304	2,460	802	770	786	635	238
29	169	.....	900	990	1,280	2,926	5,724	756	728	756	609	210
30	167	.....	852	900	1,340	2,565	2,530	756	658	756	580	185
31	179	.....	820	.....	1,380	.....	2,080	756	.....	802	.....	155
1916.												
1	135	152	210	912	912	3,008	7,475	1,770	1,012	588	408	195
2	130	153	210	955	984	3,008	6,586	1,792	998	564	408	190
3	132	154	210	984	1,131	3,159	6,540	1,814	1,055	564	397	185
4	140	158	180	984	1,296	3,159	6,586	1,880	1,385	588	418	180
5	148	160	680	955	1,476	3,219	6,358	1,902	1,314	588	440	175
6	154	162	480	912	1,568	3,310	6,085	1,946	1,296	612	451	169
7	157	165	660	912	1,770	3,310	5,640	2,035	1,332	648	429	163
8	160	169	780	872	1,990	3,129	5,205	2,102	1,350	674	315	161
9	160	174	900	872	2,215	3,129	4,956	1,531	1,367	636	315	160
10	160	179	1,660	845	2,460	3,344	4,798	1,208	1,385	600	305	159
11	160	183	1,700	818	2,338	4,116	4,709	1,279	1,385	576	305	158
12	160	190	1,600	818	2,338	4,346	4,628	1,385	1,296	576	279	158
13	160	200	1,600	818	2,264	4,038	4,506	1,385	1,226	552	253	157
14	160	800	1,200	805	1,669	3,930	4,385	1,458	1,147	528	227	156
15	158	1,200	900	805	1,513	3,930	4,346	1,403	1,086	517	224	156
16	157	1,200	800	805	1,513	4,308	3,860	1,314	1,041	484	221	155
17	157	2,000	800	805	1,440	4,956	3,412	1,279	1,012	484	220	154
18	156	1,800	750	805	1,476	5,818	3,480	1,296	969	495	219	155
19	155	2,000	750	818	1,568	6,816	3,310	1,296	926	495	218	156
20	154	2,000	700	818	1,568	7,808	3,099	1,314	872	473	216	156
21	154	2,072	700	845	1,669	8,433	2,893	1,296	845	495	215	157
22	154	1,600	700	845	1,669	8,964	2,668	1,243	818	540	215	159
23	154	1,200	700	872	1,770	8,362	2,538	1,193	778	624	214	160
24	154	1,020	650	872	1,990	7,760	2,436	1,131	752	588	212	165
25	153	780	650	858	2,460	6,678	2,288	1,070	726	576	210	168
26	152	760	900	858	3,310	5,952	2,170	1,041	687	517	208	171
27	152	900	845	858	2,864	5,952	2,102	1,026	674	484	207	175
28	151	220	845	832	2,864	6,358	2,080	1,026	674	484	204	179
29	151	200	872	845	2,864	7,950	2,012	1,026	648	484	202	187
30	151	.....	872	845	2,864	7,998	1,924	1,026	624	462	199	190
31	151	.....	912	.....	2,922	.....	1,836	1,026	.....	429	.....	193

Daily discharge, in second-feet, of St. Mary River near Lethbridge, Alta., 1911–1917—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1917.												
1	193	169	192	211	720	4,950	3,372	732	250	.....	320	278
2	195	172	195	250	710	4,765	3,192	670	220	.....	320	194
3	197	178	195	360	700	4,580	2,984	593	220	.....	427	220
4	198	183	195	475	690	4,395	2,848	530	220	.....	427	200
5	199	188	194	590	670	4,210	2,780	482	200	.....	427	190
6	199	195	192	700	660	4,000	2,780	458	200	.....	320	180
7	198	200	190	820	670	3,500	2,748	458	200	.....	320	160
8	197	205	190	1,900	690	3,372	2,748	458	180	.....	320	150
9	193	210	189	2,035	720	3,750	2,748	458	180	.....	320	145
10	192	217	189	2,315	744	4,250	2,716	466	180	.....	320	145
11	190	222	185	2,950	780	4,750	2,652	458	178	.....	320	145
12	186	226	184	1,460	780	5,500	2,620	458	172	.....	320	148
13	182	230	182	1,280	744	5,750	2,524	458	168	.....	300	160
14	180	230	180	1,040	2,684	5,500	2,492	458	168	.....	290	190
15	178	228	178	970	2,716	5,250	2,431	458	168	.....	280	210
16	175	223	176	970	2,780	5,000	2,315	474	167	.....	270	222
17	172	215	174	905	2,848	4,750	2,062	482	169	.....	260	235
18	168	205	173	905	2,916	4,750	1,739	160	180	.....	240	245
19	163	191	170	892	2,984	4,800	1,628	159	225	.....	230	252
20	161	187	169	866	2,748	4,950	1,565	170	245	.....	220	258
21	160	161	170	866	2,748	5,100	1,565	225	255	.....	208	260
22	158	152	170	866	3,372	5,000	1,544	220	250	.....	208	258
23	156	150	170	840	3,552	4,800	1,481	208	245	.....	208	255
24	155	152	170	780	3,732	4,600	1,388	212	240	.....	210	250
25	155	160	171	828	3,914	4,400	1,298	212	240	.....	210	240
26	155	170	173	804	4,099	4,255	1,178	192	240	.....	238	238
27	156	183	178	768	4,284	4,025	1,082	204	245	.....	210	235
28	157	188	183	756	4,469	3,914	984	216	250	.....	227	234
29	158	.....	189	720	4,469	3,768	892	212	245	.....	272	250
30	161	.....	195	732	4,654	3,624	840	250	245	.....	314	290
31	164	.....	200	.....	4,839	.....	804	250	.....	.....	.....	450

NOTE.—1911: Shifting control Nov. 22–29 and Dec. 21–31.
1912: Stage-discharge relation affected by ice Jan. 1 to Mar. 26 and Nov. 20 to Dec. 31.
1913: Stage-discharge relation affected by ice Jan. 1 to Apr. 5 and Nov. 16 to Dec. 31; discharge Mar. 7–16 interpolated. Shifting control Oct. 14 to Nov. 16.
1914: Stage-discharge relation affected by ice Jan. 1 to Mar. 18, Nov. 15–21, and Nov. 30 to Dec. 31.
1915: Stage-discharge relation affected by ice Jan. 1 to Mar. 20 and Nov. 21 to Dec. 31. Shifting control Aug. 12–23: May 1, discharge interpolated.
1916: Stage-discharge relation affected by ice Jan. 1 to Feb. 14 and Nov. 21 to Dec. 31. Shifting control Feb. 14–16 and Feb. 22 to Mar. 26. Discharge Feb. 17–20 and Nov. 12–13 estimated.
1917: Stage-discharge relation affected by ice Jan. 1 to Apr. 7 and discharge estimated for the following periods: Apr. 6, 7, June 1–7, 9–26, Aug. 13, 14, Aug. 31 to Sept. 9, Sept. 30, Nov. 1–23, Dec. 3–11. Control shifting Nov. 1 to Dec. 2. No observations during October.

Monthly discharge of St. Mary River near Lethbridge, Alta., 1911–1917.

[Drainage area, 1,394 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1911.						
October 13–31	578	435	535	0.384	0.27	20,162
November	1,710	295	730	.524	.58	43,438
December	325	197	252	.181	.21	15,495
The period	.....	.....	.....	.....	1.06	79,095
1912.						
January	245	195	219	.157	.18	13,466
February	195	153	176	.126	.14	10,124
March 1–26	240	133	149	.107	.10	7,682
April 4–30	1,074	898	956	.686	.69	51,185
May	2,738	1,132	1,977	1.42	1.64	121,564
June	3,190	1,626	2,074	1.48	1.65	123,410
July	3,470	1,074	1,723	1.24	1.43	105,943
August	1,794	460	782	.561	.65	48,083
September	512	350	433	.311	.35	25,765
October	589	302	479	.343	.40	29,453
November	648	420	523	.375	.42	31,121
December	415	150	271	.194	.22	16,663
The year	.....	.....	.....	.....	7.87	581,459

Monthly discharge of St. Mary River near Lethbridge, Alta., 1911–1917—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1913.						
January	140	62	87.6	0.063	0.07	5,386
February	133	62	108.0	.077	.08	5,998
March	353	107	201.0	.144	.17	12,359
April	1,600	460	1,224.0	.878	.98	72,838
May	5,450	1,025	2,002.0	1.440	1.66	123,100
June	5,934	2,730	4,163.0	2.990	3.34	247,715
July	3,558	1,110	1,859.0	1.330	1.53	114,305
August	1,350	560	942.0	.676	.78	57,921
September	588	160	339.0	.243	.27	20,172
October	796	46	447.0	.321	.37	27,485
November	490	296	368.0	.264	.29	21,898
December	289	63	197.0	.141	.16	12,113
The year	.....	.....	.....	.....	9.70	721,290
1914.						
January	252	99	191	.136	.16	11,744
February	230	56	129	.092	.10	7,164
March	596	195	336	.239	.28	20,660
April	1,469	388	799	.560	.62	46,889
May	2,373	1,446	1,851	1.320	1.52	113,812
June	2,055	1,378	1,790	1.270	1.42	106,510
July	1,705	363	992	.706	.81	60,996
August	668	154	386	.274	.32	23,734
September	510	230	318	.226	.25	18,922
October	1,630	460	1,067	.759	.88	65,607
November	1,224	417	889	.632	.70	52,899
December	370	130	203	.144	.17	12,482
The year	.....	.....	.....	.....	7.23	541,419
1915.						
January	235	150	180	.129	.149	11,068
February	212	158	186	.133	.138	10,330
March	1,990	138	897	.643	.741	55,154
April	1,080	468	705	.506	.564	41,950
May	2,926	990	1,744	1.250	1.441	107,130
June	5,220	1,446	2,744	1.970	2.198	163,280
July	5,724	1,100	1,959	1.410	1.626	120,520
August	1,912	756	1,054	.756	.872	64,581
September	1,764	658	909	.652	.727	54,089
October	1,250	588	934	.670	.772	57,429
November	818	580	739	.530	.591	43,974
December	550	155	326	.234	.270	20,045
The year	.....	.....	.....	.....	10.089	749,550
1916.						
January	160	130	153	.110	.13	9,408
February	2,072	152	757	.543	.59	43,543
March	1,700	180	820	.588	.68	50,420
April	984	805	862	.618	.69	51,293
May	3,310	912	1,959	1.400	1.61	120,425
June	8,964	3,008	5,208	3.740	4.17	309,824
July	7,475	1,836	4,029	2.890	3.33	247,674
August	2,102	1,026	1,403	1.010	1.16	86,246
September	1,385	624	1,023	.734	.82	60,858
October	674	429	546	.392	.45	33,572
November	451	199	278	.199	.22	16,542
December	195	154	168	.121	.14	10,330
The year	.....	.....	.....	.....	13.99	1,040,135
1917.						
January	199	155	176	.126	.15	10,822
February	230	150	192	.138	.14	10,663
March	200	169	183	.131	.15	11,252
April	2,950	211	995	.714	.80	59,207
May	4,839	660	2,358	1.690	1.95	144,988
June	5,750	3,372	4,542	3.250	3.63	270,268
July	3,372	804	2,064	1.480	1.71	126,908
August	732	159	369	.265	.31	22,689
September	255	167	212	.152	.17	12,615
October [a]	.....	.....	.....	.....	.....	.....
November	427	208	285	.204	.23	16,959
December	450	145	222	.159	.18	13,650
The year	.....	.....	.....	.....	9.42	700,021

[a] No records taken during October, 1917.

Mean monthly discharge, in second-feet, of St. Mary River near Lethbridge, Alta., 1911–1917.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total in acre-feet.
1911	.....	.....	.....	.....	.....	.....	.....	.....	.....	[a]535	730	215	[a]76,820
1912	263	212	[a]134	[a]949	1,977	2,074	1,723	867	433	479	523	271	593,327
1913	88	108	201	1,224	2,002	4,163	1,859	942	339	532	538	197	736,631
1914	191	129	336	799	1,851	1,790	992	386	318	1,067	889	203	542,074
1915	180	186	897	705	1,744	2,744	1,959	1,054	909	934	739	326	749,550
1916	153	757	820	862	1,959	5,208	4,029	1,403	1,023	546	278	168	1,040,338
1917	176	192	183	995	2,358	4,542	2,064	369	212	.....	285	222	700,007
Average	175	264	487	917	1,982	3,420	2,104	838	539	712	569	257	726,988
Average, run-off acre-feet	10,760	14,982	29,944	54,565	121,868	203,504	129,370	51,465	32,073	43,779	33,858	15,802	741,970
Average run-off per square mile													522

[a] Incomplete; record not included in average.

Duration of flow (number of days in the year) of St. Mary River near Lethbridge, Alta., 1911–1917.

Flow (second-feet).	1911	1912	1913	1914	1915	1916	1917	Total.	Average.
8,000	.....	.....	.....	.....	.....	3	.....	3	.....
7,000	.....	.....	.....	.....	.....	8	.....	8	1
6,000	.....	.....	.....	.....	.....	16	.....	16	2
5,000	.....	.....	12	.....	2	21	7	42	6
4,000	.....	.....	19	.....	3	33	30	85	12
3,000	.....	1	32	.....	8	51	32	124	18
2,000	.....	36	40	9	9	77	68	239	34
1,900	.....	41	43	17	60	83	69	313	45
1,800	.....	52	45	37	64	86	69	353	50
1,700	1	69	47	40	70	91	70	388	55
1,600	1	73	65	52	77	98	71	437	62
1,500	5	77	66	58	82	104	74	466	67
1,400	5	78	68	75	87	109	76	498	71
1,300	6	78	75	79	100	120	77	535	76
1,200	6	86	102	85	111	135	79	604	86
1,100	7	94	126	89	125	139	80	660	94
1,000	7	106	135	119	138	154	82	741	106
900	8	120	137	133	167	169	87	821	117
800	9	134	138	141	199	202	98	921	132
700	11	141	150	142	227	214	113	1,048	149
600	13	151	157	154	242	239	119	1,075	154
500	34	178	176	202	257	243	122	1,212	173
400	41	230	189	215	269	261	140	1,445	206
300	59	253	223	228	282	266	162	1,473	210
200	79	299	261	305	310	290	235	1,779	254
100	80	358	328	350	365	366	334	2,181	311
50	80	358	365	365	365	366	334	2,233	319

STATIONS ON TRIBUTARIES.

SWIFTCURRENT CREEK AT MANY GLACIER, MONT.

LOCATION.—In sec. 12, T. 35 N., R. 16 W., at outlet of McDermott Lake, at Many Glacier, in Glacier National Park, about 14 miles southwest of Babb, in Teton County. (See Pl. VI, *A*.)

DRAINAGE AREA.—31.4 square miles (measured on Glacier National Park topographic map).

RECORDS AVAILABLE.—June 6, 1912, to December 31, 1917.

GAGE.—Vertical staff on shore of lake about 75 feet from right end of outlet; prior to May 22, 1916, a staff gage on lake shore near left end of outlet.

DISCHARGE MEASUREMENTS.—Made by wading at outlet of lake or below the falls; high-water measurements made from highway bridge above power house; section at bridge is very poor. From 1912 to 1914 high-water measurements were made from a cable at outlet of lake.

CHANNEL AND CONTROL.—Limestone outcrop at outlet of lake; just below the control is a cataract. (See Pl. VI, *A*.) Movement of a few small boulders scattered over the control is the only cause of change in rating curve.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 4.75 feet June 17, 1916 (discharge, 1,530 second-feet); minimum discharge recorded, 8.7 second-feet April 1, 1913, by current meter measurement. The gage read 1.30 feet, but the stage-discharge relation was affected by ice.

ICE.—Stage-discharge relation very little affected by ice.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent except during an occasional period of high water when gravel and small boulders may lodge on control. Daily discharge ascertained by applying mean daily gage height to rating table. Records considered good.

Discharge measurements of Swiftcurrent Creek at Many Glacier, Mont., 1912–1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1912.		*Feet.*	*Sec.-ft.*	1915.		*Feet.*	*Sec.-ft.*
June 6	W. A. Lamb	2.53	280	July 17	B. E. Jones	2.06	141
Aug. 8	do	2.06	117	Aug. 11	Lamb and Hoyt	2.14	160
Dec. 15	do	1.39	26	1916.			
1913.				Apr. 24	W. A. Lamb	1.59	57
Apr. 1	do	1.30	8.7	June 9	A. H. Tuttle	3.20	597
June 26	do	2.93	456	25	do	3.30	725
July 30	do	2.39	227	July 17	W. A. Lamb	2.85	534
Aug. 22	Lamb and Hoyt	2.13	122	Aug. 17	do	2.19	180
1914.				1917.			
May 22	W. A. Lamb	2.8	381	Apr. 14	do	1.48	19.6

NOTE.—Dec. 15, 1912, ice at gage and along banks. Apr. 1, 1913, and Apr. 14, 1917, stage-discharge relation affected by ice.

A. GAGING STATION ON SWIFTCURRENT CREEK AT OUTLET OF McDERMOTT LAKE, MANY GLACIER, MONT.

B. GAGING STATION BELOW SHERBURNE DAM ON SWIFTCURRENT CREEK, MONT.

Daily discharge, in second-feet, of Swiftcurrent Creek at Many Glacier, Mont., 1912–1917.

Day.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	June.	July.	Aug.	Sept.	Oct.	Nov.
1912.							1912.						
1	.....	364	155	103	68	68	16	338	188	127	84	68	.....
2	.....	312	155	103	68	68	17	312	188	127	84	68	.....
3	.....	312	127	103	68	68	18	312	188	127	84	68	.....
4	.....	266	127	103	68	68	19	364	188	127	84	68	.....
5	.....	266	127	103	68	68	20	422	266	127	84	68	.....
6	280	266	127	103	68	68	21	422	364	127	68	68	.....
7	266	225	127	103	68	68	22	485	312	127	68	68	.....
8	364	225	127	103	68	68	23	485	266	127	68	68	.....
9	485	225	127	103	84	.....	24	628	225	127	68	68	.....
10	554	225	127	103	84	.....	25	485	188	127	68	68	.....
11	485	225	127	103	68	.....	26	422	188	127	68	68	.....
12	706	225	127	103	68	.....	27	364	188	127	68	68	.....
13	554	188	127	103	68	.....	28	312	188	127	68	68	.....
14	554	188	127	103	68	.....	29	312	188	103	68	68	.....
15	454	188	127	84	68	.....	30	422	155	103	68	68	.....
							31	.....	155	103	.....	68	.....

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1913.								
1	.....	796	668	206	141	76	76	62
2	.....	822	618	206	141	76	76	62
3	.....	744	520	206	141	76	85	62
4	.....	744	496	206	141	76	94	62
5	.....	770	472	206	141	80	91	62
6	.....	744	.....	216	141	84	87	62
7	.....	744	.....	225	138	89	84	62
8	.....	796	.....	236	135	94	78	64
9	.....	744	.....	246	132	94	73	65
10	.....	744	.....	226	128	94	68	66
11	.....	796	.....	206	125	94	62	68
12	.....	744	.....	216	123	104	62	59
13	.....	744	.....	225	119	115	62	50
14	.....	744	.....	225	117	115	62	50
15	.....	718	.....	225	115	115	62	50
16	84	718	.....	216	115	115	67	50
17	103	668	.....	206	115	121	71	50
18	188	668	.....	197	115	127	76	50
19	188	593	.....	188	104	110	76	50
20	246	668	.....	172	94	94	76	50
21	225	618	.....	155	94	104	76	50
22	309	568	.....	155	94	115	73	50
23	424	520	.....	155	98	115	71	51
24	544	496	.....	155	103	115	68	52
25	643	472	.....	155	90	115	66	54
26	874	472	.....	155	76	94	64	55
27	1,010	520	.....	155	76	91	62	54
28	1,150	770	.....	155	76	87	62	52
29	901	744	.....	155	76	84	62	51
30	848	718	.....	150	76	80	62	50
31	874	.....	.....	146	.....	76	.....	49

Day.	Apr.	May.	June.	Day.	Apr.	May.	June.	Day.	Apr.	May.	June.
1914.				1914.				1914.			
1	84	186	445	11	103	355	188	21	155	436	418
2	84	178	500	12	103	382	172	22	155	378	354
3	84	200	590	13	127	324	181	23	155	391	290
4	84	250	680	14	127	364	319	24	172	364	225
5	84	200	665	15	127	418	400	25	188	540	188
6	84	226	500	16	127	475	400	26	206	540	155
7	84	250	378	17	127	530	445	27	225	490	238
8	84	275	288	18	127	580	445	28	225	378	256
9	84	300	225	19	155	490	490	29	188	378	335
10	103	325	188	20	155	445	540	30	188	355	314
								31	.....	391	.....

Daily discharge, in second-feet, of Swiftcurrent Creek at Many Glacier, Mont., 1912–1917— Continued.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1915.											
1	.....	.....	.....	314	222	406	177	125	92	125	.....
2	.....	.....	.....	406	314	360	177	138	141	110	.....
3	.....	.....	.....	550	360	268	183	245	224	110	.....
4	.....	.....	.....	406	406	291	183	222	208	107	.....
5	.....	.....	.....	406	464	268	151	173	182	116	.....
6	.....	.....	.....	454	324	291	167	167	185	116	.....
7	.....	.....	.....	550	360	351	177	146	141	110	.....
8	.....	.....	.....	600	314	314	167	114	125	103	.....
9	.....	.....	.....	406	277	277	183	116	112	99	.....
10	.....	.....	.....	268	314	314	151	95	110	90	.....
11	.....	.....	.....	222	245	277	167	99	112	90	.....
12	.....	.....	.....	222	231	231	157	92	110	81	.....
13	.....	.....	.....	268	183	183	138	76	107	73	.....
14	.....	.....	.....	314	277	191	167	84	112	73	.....
15	.....	.....	.....	314	291	151	148	76	112	68	.....
16	.....	.....	.....	360	360	151	151	99	103	73	.....
17	.....	.....	.....	314	397	157	151	138	101	73	.....
18	.....	.....	.....	268	454	143	138	161	99	65	.....
19	.....	.....	.....	268	351	151	151	202	101	65	.....
20	.....	.....	.....	268	360	138	138	161	92	65	.....
21	.....	.....	.....	268	360	167	151	146	82	63	.....
22	.....	.....	.....	268	360	191	151	125	88	59	.....
23	.....	.....	.....	183	314	202	138	105	90	63	.....
24	.....	.....	.....	183	360	202	141	112	84	65	.....
25	.....	.....	314	183	337	183	148	94	88	59	.....
26	.....	.....	268	222	478	177	135	95	95	53	.....
27	.....	.....	268	183	502	177	141	94	107	52	.....
28	.....	.....	222	202	383	195	143	84	107	51	.....
29	.....	.....	222	291	430	191	125	94	121	50	.....
30	.....	.....	183	314	360	161	114	84	125	50	.....
31	.....	.....	.....	245	.....	177	125	.....	121	.....	.....
1916.											
1	.....	44	43	159	220	715	212	159	70	63	55
2	.....	42	41	141	188	770	212	159	67	67	54
3	.....	40	41	178	204	770	208	208	67	68	55
4	.....	39	40	251	535	935	204	560	63	70	55
5	.....	38	37	.....	660	825	193	688	62	73	54
6	.....	39	38	.....	585	715	178	660	60	71	53
7	.....	41	38	.....	460	660	172	560	60	70	53
8	.....	42	39	.....	485	660	178	510	60	68	52
9	.....	41	42	.....	560	715	292	410	59	71	52
10	.....	42	48	.....	770	715	315	185	58	68	48
11	.....	42	53	.....	610	715	242	138	58	65	47
12	.....	50	59	.....	535	688	201	155	55	63	46
13	.....	65	60	.....	510	715	185	149	55	62	46
14	.....	70	59	.....	560	660	193	133	53	60	45
15	.....	74	70	.....	825	535	204	116	53	60	44
16	.....	67	70	.....	1,220	510	197	112	54	60	44
17	.....	67	76	.....	1,520	485	197	97	58	58	44
18	38	53	70	.....	1,040	460	238	97	62	55	42
19	38	56	65	.....	1,340	485	260	94	63	55	42
20	56	59	70	.....	1,280	386	208	99	60	53	40
21	53	70	60	.....	1,400	362	182	95	56	54	40
22	48	79	59	.....	880	338	168	92	55	54	40
23	45	73	54	.....	660	315	193	82	56	53	41
24	39	71	53	.....	610	292	216	79	58	53	40
25	41	59	54	.....	715	269	216	79	60	53	36
26	41	59	70	.....	770	260	224	82	62	54	35
27	39	50	147	.....	770	251	208	81	63	53	37
28	41	52	292	.....	990	242	185	79	63	54	39
29	38	53	460	.....	990	233	178	76	64	56	42
30	.....	47	185	.....	880	212	178	73	65	58	44
31	.....	47	.....	.....	.....	201	168	.....	65	.....	40

Daily discharge, in second-feet, of Swiftcurrent Creek at Many Glacier, Mont., 1912–1917—Continued.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1917.											
1				48	292	525	152	112	70	63	55
2				47	470	545	149	112	67	67	54
3				48	445	570	144	107	67	68	55
4				45	410	570	133	101	63	70	55
5				46	415	545	128	94	62	73	54
6				47	485	555	128	86	60	71	53
7				55	580	565	138	73	60	70	53
8				76	759	520	128	78	60	68	52
9				97	1,160	525	128	84	59	71	52
10				133	1,020	525	133	81	58	68	48
11				228	610	530	125	84	58	65	47
12				315	510	460	138	90	55	63	46
13				440	386	450	149	84	55	62	46
14			20	580	435	386	159	86	53	60	45
15			26	908	470	376	159	92	53	60	44
16			32	610	825	372	159	97	54	60	44
17			39	600	1,110	381	165	107	58	58	44
18			47	400	630	372	168	105	62	55	42
19			48	362	715	391	172	101	63	55	42
20			48	343	676	391	175	95	60	53	40
21			50	353	615	410	172	95	56	54	40
22			51	348	635	343	168	95	55	54	40
23			51	400	570	329	159	95	56	53	41
24			52	485	475	292	152	107	58	53	40
25			53	575	671	274	141	103	60	53	36
26			53	585	676	260	133	90	62	54	35
27			54	575	655	220	130	92	63	53	37
28			55	595	595	212	125	97	63	54	39
29			53	570	575	201	125	97	64	56	42
30			50	450	515	193	121	92	65	58	44
31				362		172	116		65		40

NOTE.—1913: Discharge July 6–31 estimated at 270 second-feet.
1914: Discharge estimated Apr. 1–4, May 1–11, and June 27–30.
1915: Discharge estimated Nov. 27–30.
1916: Discharge estimated Mar. 1–4 and June 1–3. No gage readings May 5 to June 3.
1917: Discharge estimated Apr. 1–13.
All estimates made by comparison with records of flow of Swiftcurrent Creek at Sherburne Lake.

Monthly discharge of Swiftcurrent Creek at Many Glacier, Mont., 1912–1917.

[Drainage area, 31.4 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1912.						
June 6–30	706	266	431	13.7	12.75	21,400
July	364	155	230	7.32	8.44	14,100
August	155	103	126	4.01	4.62	7,750
September	103	68	87.5	2.79	3.11	5,210
October	84	68	69.0	2.20	2.54	4,240
November 1–8	68	68	68.0	2.17	.65	1,080
The period						53,800
1913.						
May 6–31	1,150	84	538	17.1	10.18	17,100
June	822	472	687	21.9	24.43	40,900
July			316	10.1	11.64	19,400
August	246	146	192	6.11	7.04	11,800
September	141	76	113	3.60	4.02	6,720
October	127	76	97.6	3.11	3.58	6,000
November	94	62	71.8	2.29	2.56	4,270
December	68	49	55.6	1.77	2.04	3,420
The period						109,610

Monthly discharge of Swiftcurrent Creek at Many Glacier, Mont., 1912–1917—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1914.						
April	225	84	133	4.24	4.73	7,910
May	580	178	368	11.7	13.49	22,600
June	680	155	360	11.5	12.83	21,400
The period						51,910
1915.						
April 25–30	314	183	246	7.83	1.75	2,930
May	600	183	314	10.0	11.53	19,300
June	502	183	346	11.0	12.27	20,600
July	406	138	224	7.13	8.22	13,800
August	183	114	153	4.87	5.62	9,410
September	245	76	125	3.98	4.44	7,440
October	224	82	119	3.79	4.37	7,320
November	125	50	79.2	2.52	2.81	4,710
The period						85,510
1916.						
February 18–29	56	38	43.1	1.37	.61	1,030
March	79	38	53.9	1.72	1.98	3,310
April	460	37	83.1	2.65	2.96	4,940
May 1–4	251	141	182	5.80	.86	1,440
June	1,520	188	759	24.2	27.0	45,200
July	935	201	519	16.5	19.0	31,900
August	315	168	207	6.59	7.60	12,700
September	688	73	204	6.50	7.25	12,100
October	70	53	60.1	1.91	2.20	3,700
November	73	53	60.7	1.93	2.16	3,610
December	55	35	45.3	1.44	1.66	2,790
The period						123,000
1917.						
April 14–30	55	20	46	1.46	.92	1,550
May	908	45	346	11.0	12.68	21,300
June	1,160	292	613	19.5	21.76	36,500
July	570	172	402	12.8	14.76	24,700
August	175	116	144	4.59	5.29	8,850
September	112	73	94.4	3.01	3.36	5,620
October	133	56	81.2	2.59	2.99	4,990
November	62	52	55.7	1.77	1.98	3,310
December	147	52	70.4	2.24	2.58	4,330
The period						111,000

Mean monthly discharge, in second-feet, of Swiftcurrent Creek at Many Glacier, Mont., 1912–1917.

Year.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total in acre-feet.
1912	.....	.....	.....	.....	[a]431	230	126	87.5	69.0	[b]68.0	.....	53,800
1913	.....	.....	.....	[c]538	687	316	192	113	97.6	71.8	55.6	110,000
1914	.....	.....	133	368	360	.....	.....	.....	.....	.....	.....	51,900
1915	.....	.....	[d]246	314	346	224	153	125	119	79.2	.....	85,500
1916	[e]43.1	53.9	83.1	[f]182	759	519	207	204	60.1	60.7	45.3	123,000
1917	.....	.....	[g]46.0	346	613	402	144	94.4	81.2	55.7	70.4	111,000
Average	.....	.....	.....	.....	533	338	164	125	85.4	.....	.....	.....
Median	.....	.....	.....	.....	522	316	153	113	81.2	.....	.....	.....
Maximum	.....	.....	.....	.....	759	519	207	204	119	.....	.....	.....
Minimum	.....	.....	.....	.....	346	224	126	87.5	60.1	.....	.....	.....

[a] June 6–30.
[b] Nov. 1–8.
[c] May 16–31.
[d] Apr. 25–30.
[e] Feb. 18–29.
[f] May 1–4.
[g] Apr. 14–30.

NOTE.—Average not computed if the monthly mean was not available for five years of more. Means for periods of 16 days or over assumed mean for the month. Means for less than 16 days not included when computing average and median values. The totals in acre-feet were not averaged because the records covered different periods in different years. The medians given were obtained by arranging the monthly means in their order of magnitude and taking the middle mean, or, if the number was even, the average of the two middle means. By using daily discharge a somewhat lower median discharge would be obtained.

SWIFTCURRENT CREEK BELOW SHERBURNE LAKE DAM, MONT.,

LOCATION.—In sec. 35, T. 36 N., R. 15 W., near outlet of Lower Sherburne Lake, in Teton County. (See Pl. VI, *B*.)

DRAINAGE AREA.—64 square miles (measured on topographic map of Glacier National Park.)

RECORDS AVAILABLE.—July 1, 1912, to December 31, 1917.

GAGE.—Staff gage on left bank about 300 feet below the spillway of Sherburne Lake dam; read by employees of the United States Reclamation Service. From July 1 1912, to November 9, 1914, a vertical staff gage was maintained on the left bank near the outlet of the lake, and at a datum different from that of the present gage.

DISCHARGE MEASUREMENTS.—Made by wading or from cable 50 feet below gage.

CHANNEL AND CONTROL.—An outcropping limestone ledge, somewhat broken and irregular, forms the control, and is subject to small changes. A landslide caused by the building of the dam has forced out the left bank a foot or so into the river channel.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 7.85 feet June 17, 1916 (discharge, 2,280 second-feet); minimum stage, no flow December 22–28, 1917, owing to storage in reservoir above.

ICE.—Stage-discharge relation not seriously affected by ice.

DIVERSIONS.—None.

REGULATION.—The natural flow of the stream was affected from 1915–1917, by placing and removing flashboards on the temporary dam built at the outlet of the lake in connection with the construction of the Sherburne Lake storage dam.

ACCURACY.—Stage-discharge relation not permanent, owing to small movements of the gravel at the control during high water. A landslide, first noticed in 1917, has changed the control. Discharge measurements indicate the time and amount of the effect on the rating curve. Flow partly regulated by operation of gates. Records good.

Discharge measurements of Swiftcurrent Creek below Sherburne Lake dam, Mont., 1912–1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1912.		*Feet.*	*Sec.-ft.*	1915.		*Feet.*	*Sec.-ft.*
July 1	R. R. Randell	4.42	453	Aug. 11	Lamb and Hoyt	2.64	222
Aug. 15	W. A. Lamb	3.10	151	Oct. 4	W. A. Lamb	3.10	309
Sept. 18	do	2.7	103	Nov. 22	do	1.60	71
Dec. 15	do	2.53	47				
				1916.			
1913.				Jan. 24	W. A. Lamb	1.20	32.6
June 11	R. R. Randell	6.38	1,180	Mar. 7	do	1.22	37.6
26	W. A. Lamb	5.06	642	Apr. 24	do	.49	3.8
July 30	do	3.98	340	May 22	Lamb and Tuttle	3.77	384
Sept. 15	do	2.73	99	June 9	A. H. Tuttle	5.00	771
				July 17	W. A. Lamb	3.97	584
1914.				Aug. 17	do	2.68	252
Mar. 14	W. A. Lamb	1.06	40	Sept. 16	do	2.08	132
May 21	do	4.95	565	Nov. 22	do	1.46	58
July 19	do	3.70	276				
Sept. 9	do	3.45	135	1917.			
Nov. 7	do	6.50	503	Apr. 13	W. A. Lamb	1.28	50
Dec. 16	B. E. Jones	2.45	47	May 17	do	5.25	970
				June 14	do	5.20	914
1915.				30	do	4.39	636
Apr. 23	W. A. Lamb	3.21	387	July 20	do	3.96	515
May 25	do	2.98	298	Aug. 17	do	2.30	154
June 21	do	3.60	461	Sept. 13	do	1.82	85
July 18	B. E. Jones	2.65	221				

NOTE.—1912: Sept. 18, gage height affected by wave action. Dec. 15, stage-discharge relation affected by ice.

1914: Sept. 9, stage-discharge relation affected by obstruction of channel due to excavation for Sherburne Lake dam. Nov. 7, gage height refers to old gage, and is affected by backwater from Sherburne Lake dam. Gage heights of subsequent measurements refer to new staff gage below the dam.

1916: May 22 and June 9, stage-discharge relation affected by drift on control.

1917: Stage-discharge relation affected by gradual slipping of right bank, which moved out about a foot into the stream.

Daily discharge, in second-feet, of Swiftcurrent Creek below Sherburne Lake dam, Mont., 1912–1917.

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1912.							1912.						
1	449	266	120	80	76	71	16	302	158	132	76	103	.....
2	449	254	138	77	72	70	17	290	166	114	84	88	.....
3	407	254	138	72	69	69	18	254	166	93	120	80	.....
4	353	266	138	74	66	68	19	212	151	93	138	84	.....
5	353	266	132	75	69	67	20	315	138	103	138	103	.....
6	353	222	126	77	70	66	21	478	138	103	144	126	.....
7	328	192	126	78	72	65	22	571	144	93	132	114	.....
8	302	183	126	76	80	64	23	571	158	93	144	93	.....
9	302	174	144	77	103	63	24	672	166	93	120	83	.....
10	290	174	166	77	132	62	25	571	166	84	114	98	.....
11	302	174	174	76	132	59	26	449	166	84	93	88	.....
12	353	166	174	75	114	56	27	380	151	84	88	78	.....
13	353	158	166	73	120	53	28	340	138	84	93	76	.....
14	366	158	174	69	114	50	29	315	126	84	103	72	.....
15	328	151	151	70	114	47	30	302	126	80	93	70	.....
							31	278	98	.....	88	.....	.....

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1913.												
1	.....	.....	.....	.....	166	1,500	1,140	315	151	84	128	61
2	.....	.....	.....	.....	138	1,450	1,090	319	151	84	118	61
3	.....	.....	.....	.....	120	1,360	539	324	151	84	108	61
4	.....	.....	.....	.....	114	1,310	508	328	151	84	96	63
5	.....	.....	.....	.....	103	1,270	478	334	151	84	84	64
6	.....	.....	.....	.....	103	1,220	471	340	151	84	96	66
7	.....	.....	.....	.....	103	1,180	464	353	148	84	108	65
8	.....	.....	.....	.....	103	1,160	456	366	144	84	120	64
9	.....	.....	.....	.....	103	1,140	449	360	141	87	106	62
10	.....	.....	.....	.....	166	1,100	459	353	138	90	93	61
11	.....	.....	.....	.....	192	1,050	468	346	136	93	88	61
12	.....	.....	.....	.....	254	1,030	478	340	134	130	84	61
13	.....	.....	.....	.....	302	1,010	464	340	132	166	89	62
14	.....	.....	.....	.....	315	983	449	340	129	194	93	64
15	.....	.....	.....	.....	302	957	430	340	126	222	98	62
16	.....	.....	.....	.....	290	930	412	340	112	198	100	61
17	.....	.....	.....	.....	243	910	393	328	98	175	103	61
18	.....	.....	.....	.....	232	891	380	315	93	151	94	61
19	.....	.....	.....	.....	212	891	366	290	89	127	84	61
20	.....	.....	.....	.....	192	891	340	266	84	103	87	61
21	.....	.....	.....	.....	212	878	315	229	86	100	90	61
22	.....	.....	.....	.....	278	866	290	192	88	98	93	61
23	.....	.....	.....	.....	604	853	266	179	90	118	85	61
24	.....	.....	.....	.....	779	853	258	166	91	138	77	61
25	.....	.....	.....	.....	1,010	853	251	163	93	166	76	61
26	.....	.....	.....	.....	1,310	975	243	161	88	194	74	61
27	.....	.....	.....	.....	1,550	1,100	254	158	84	222	71	61
28	.....	.....	.....	.....	1,850	1,220	266	156	84	202	69	61
29	.....	.....	.....	.....	1,700	1,200	297	153	84	183	66	61
30	.....	.....	.....	.....	1,500	1,180	328	151	84	160	64	61
31	.....	.....	.....	.....	1,450	.....	322	151	.....	138	.....	61

Daily discharge, in second-feet, of Swiftcurrent Creek below Sherburne Lake dam, Mont., 1912–1917—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1914.												
1					232	571	435	183	126			
2					222	779	407	183	126			
3					707	1,010	340	183	126			
4					853	1,090	315	174	120			
5					638	970	638	174	120			
6					449	707	672	183	114			
7					340	478	571	183	120			
8					278	393	508	183	138			
9					380	328	449	174	138		288	
10					638	222	393	166	132		288	
11					638	222	393	151	132		288	
12					508	222	366	144	126		288	
13					508	266	366	138			276	
14					571	672	366	138			276	
15					707	672	366	138			276	
16					853	571	353	138			276	
17					930	604	315	183				
18				222	891	707	290	212				
19				222	779	707	278	166				
20				353	743	638	266	158				
21				366	638	604	243	138				
22				340	571	571	243	138				
23				315	571	315	222	151				
24				340	604	290	212	222				
25				340	853	243	202	183				
26				290	891	266	183	151				
27				278	707	340	183	138				
28				278	539	366	174	138				
29				232	478	478	174	132				
30				202	407	449	174	132				
31					449		254	132				
1915.												
1					420	325	525	264	155	106	150	60
2					556	378	525	253	164	230	158	60
3					656	300	494	253	231	349	158	65
4					588	325	464	264	325	403	158	65
5					464	392	392	253	288	303	150	65
6					351	464	378	231	231	166	166	65
7					300	494	392	231	148	201	166	65
8					364	464	435	231	155	201	150	65
9					556	464	435	231	155	183	142	65
10					732	406	435	231	164	183	135	65
11					773	231	378	210	155	183	135	65
12					656	351	325	210	140	120	120	60
13					588	325	210	210	140	106	113	60
14					525	338	231	210	140	120	142	60
15					464	378	231	220	101	142	138	60
16					392	464	210	210	90	174	134	
17					351	525	231	210	113	183	130	
18					325	621	210	190	276	120	126	
19					288	588	200	190	312	120	123	
20					242	556	210	190	276	120	120	
21					220	494	231	190	200	120	106	
22					210	406	253	190	155	120	87	
23					200	378	253	190	155	120	93	
24				300	231	406	264	190	155	142	93	
25				242	300	621	264	155	140	128	135	
26				242	300	816	253	140	140	120	166	
27				210	351	773	253	155	126	183	106	
28				210	325	693	276	155	126	281	81	
29				231	378	621	288	148	126	113	70	
30				276	231	588	276	148	113	166	70	
31					140		264	140		210		

Daily discharge, in second-feet, of Swiftcurrent Creek below Sherburne Lake dam, Mont., 1912–1917—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1916.												
1	.....	.....	65	106	349	293	1,130	260	210	65	56	30
2	.....	.....	60	100	303	251	1,170	270	375	65	65	34
3	.....	.....	55	93	303	272	1,350	270	494	65	65	38
4	.....	.....	50	93	373	413	1,350	230	526	70	76	39
5	.....	.....	41	87	590	732	1,220	220	766	76	70	42
6	.....	33	41	87	766	770	1,000	230	730	58	70	45
7	.....	37	38	93	922	695	880	220	558	56	81	45
8	.....	37	41	106	770	590	880	220	158	56	70	43
9	.....	33	55	120	624	770	920	281	29	56	81	39
10	.....	37	65	135	440	846	960	349	100	56	76	38
11	.....	37	106	158	362	846	960	349	150	56	58	35
12	.....	33	135	166	104	846	1,260	303	166	56	51	33
13	.....	33	201	183	293	770	1,130	260	158	58	54	32
14	.....	37	183	55	293	770	433	230	158	48	60	32
15	.....	41	166	150	212	846	349	220	142	56	210	30
16	.....	81	150	201	194	846	526	230	135	46	349	29
17	.....	135	150	210	177	2,250	590	230	128	42	281	27
18	.....	135	135	201	186	1,860	590	303	113	46	166	27
19	.....	120	120	250	231	1,860	558	303	113	56	113	27
20	.....	120	142	240	315	1,770	433	281	106	76	81	29
21	.....	106	201	183	362	2,000	403	281	106	106	65	29
22	.....	106	192	166	387	1,680	403	250	106	9	54	29
23	.....	93	183	150	338	960	349	230	100	7	51	28
24	.....	81	166	106	293	730	325	230	120	7	42	27
25	.....	81	150	4.0	293	880	325	250	113	9	42	26
26	.....	76	166	4.4	272	1,000	325	270	113	12	42	26
27	.....	70	158	4.5	251	1,080	349	270	87	18	38	25
28	.....	70	142	65	251	1,260	325	250	93	34	36	24
29	.....	65	128	349	293	1,400	281	240	81	70	32	24
30	.....	.....	120	403	315	1,310	260	230	70	54	34	21
31	.....	.....	106	.....	293	.....	260	220	.....	60	.....	21
1917.												
1	18	22	18	30	60	584	646	202	118	108	246	54
2	14	20	18	30	54	646	646	173	118	113	193	56
3	15	18	18	30	27	646	646	145	112	117	202	56
4	15	20	15	28	6	646	712	93	104	114	180	56
5	19	21	14	36	8	614	712	69	100	123	142	57
6	19	20	15	36	12	614	712	73	94	170	176	56
7	18	23	15	36	40	746	712	159	55	187	180	56
8	18	22	14	43	97	930	678	236	56	170	148	55
9	18	21	14	43	420	1,010	646	202	62	134	134	54
10	18	22	14	47	420	1,070	614	187	68	105	124	55
11	19	23	14	49	394	1,070	584	145	75	108	118	55
12	21	24	15	53	526	1,050	584	145	77	104	92	56
13	21	24	13	51	646	1,010	584	145	89	105	82	56
14	22	22	13	49	712	970	420	145	124	99	76	56
15	24	21	13	51	818	892	300	145	138	65	70	32
16	24	24	13	51	930	892	420	159	131	49	57	10
17	22	24	13	49	930	970	446	159	118	54	54	42
18	20	21	12	48	892	1,010	554	159	118	71	49	93
19	20	21	12	48	854	1,010	554	173	118	60	38	93
20	20	21	15	49	782	1,010	498	187	118	83	46	95
21	18	21	15	55	712	1,010	472	202	112	55	43	98
22	18	21	17	60	472	1,010	472	202	105	59	44	.....
23	18	21	18	62	420	970	370	187	105	57	38	.....
24	18	20	16	65	370	980	322	187	105	59	40	.....
25	19	21	15	66	584	892	322	173	112	58	43	.....
26	19	21	16	69	782	892	256	159	112	57	48	.....
27	19	21	26	65	782	854	256	159	112	57	51	.....
28	25	20	25	62	782	678	278	105	112	58	55	.....
29	24	.....	28	59	818	614	300	105	112	55	62	1
30	25	.....	28	57	782	646	236	105	112	130	53	1
31	22	.....	29	.....	678	.....	218	112	.....	194	.....	3

NOTE.—1912: Dec. 2–15, stage-discharge relation affected by ice; discharge estimated.
1914: Sept. 13–30, discharge estimated 125 second-feet per day.
1915: Nov. 15–19, stage-discharge relation affected by ice on control; discharge interpolated. Rise Nov. 25 due to removal of flashboards on dam. Dec. 15 gage frozen in. See also footnote to monthly discharge tables.

The following are observer's notes relating to flashboards on a temporary dam above the gage.

1915.
May 30. Put in flashboards.
June 11. Notes simply "flashboards."
Aug. 25. Put in flashboards.
Sept. 15. Put in flashboards.
18. Removed flashboards.
21. One flashboard in.
Nov. 14. Flashboards removed.
25. Flashboards removed.
1916.
Apr. 14. Board put on dam.
1916.
Apr. 24. Water shut off by board on dam.
28. Boards taken off in p. m.
May 12. Boards put on dam a. m.; removed p. m.
Sept. 8. Boards put on dam.
Oct. 21. Flashboards removed a.m. and replaced p. m.
Nov. 15. Flashboards removed p. m.
1917.
May. 3. Flashboards put on dam.
8. Flashboard removed.
12. More flashboards removed.

Monthly discharge of Swiftcurrent Creek below Sherburne Lake dam, Mont., 1912–1917.

[Drainage area, 64 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1912.						
July	672	212	374	5.84	6.73	23,000
August	266	98	175	2.74	3.16	10,800
September	174	80	120	1.88	2.10	7,140
October	144	69	93.4	1.46	1.68	5,740
November	132	66	91.9	1.44	1.61	5,470
December 1–15	71	47	62.0	.969	.54	1,840
The period						54,000
1913.						
May	1,850	103	516	8.06	9.29	31,700
June	1,500	853	1,070	16.7	18.63	63,700
July	1,140	243	430	6.72	7.75	26,400
August	366	151	274	4.28	4.93	16,800
September	151	84	116	1.81	2.02	6,900
October	222	84	133	2.08	2.40	8,180
November	128	64	91.4	1.43	1.60	5,440
December	66	61	61.7	.966	1.11	3,790
The period						163,000
1914.						
April 18–30	366	202	291	4.55	2.20	7,500
May	930	222	599	9.36	10.79	36,800
June	1,090	222	525	8.20	9.15	31,200
July	672	174	334	5.22	6.02	20,500
August	222	132	162	2.53	2.92	9,960
September			126	1.97	2.20	7,500
The period						113,000
1915.						
April 24–30	300	210	244			3,390
May	773	140	402			24,700
June	816	231	473			28,100
July	525	200	316			19,400
August	264	140	203			12,500
September	325	90	173			10,300
October	403	106	175			10,800
November	166	70	127			7,560
December 1–15	65	60	63.0			1,870
The period						119,000
1916.						
February 6–29	135	33	70.7			3,370
March	201	38	120			7,380
April	403	4.0	142			8,450
May	922	104	360			22,100
June	2,250	251	1,020			60,700
July	1,350	260	687			42,200
August	349	220	257			15,800
September	766	29	210			12,500
October	106	7	50			3,070
November	349	32	85.6			5,090
December	45	21	31.4			1,930
The period						183,000
1917.						
January	25	14	19.7			1,210
February	24	18	21.4			1,190
March	29	12	16.8			1,030
April	69	28	49.2			2,930
May	930	6	510			31,400
June	1,070	581	863			51,400
July	712	218	489			30,100
August	236	69	155			9,530
September	138	55	103			6,130
October	194	49	96.1			5,910
November	246	38	96.1			5,720
December	98	1	40.2			2,470
The year						149,00

NOTE.—Flow of stream partly controlled beginning with 1915 and "second-feet per square mile" and "run-off depth in inches" not computed. June 1–30, 1915, a total of 1,560 acre-feet of water was stored in Sherburne Lake by a temporary construction dam; 134 acre-feet was stored Aug. 25 to Sept. 18 and was released Sept. 18–20, 1915. Small quantities were stored at other times as shown by the footnote to the table of daily discharge, and the total flow Dec. 22–28, 1917, was stored.

Mean monthly discharge, in second-feet, of Swiftcurrent Creek below Sherburne Lake dam, Mont., 1912–1917.

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total in acre-feet.
1912	.....	.....	.....	.....	.....	.....	374	175	120	93.4	91.9	[a]62.0	54,000
1913	.....	.....	.....	.....	516	1,070	430	274	116	133	91.4	61.7	163,000
1914	.....	.....	.....	[b]291	599	525	334	162	126	.....	.....	.....	113,000
1915	.....	.....	.....	[c]244	402	473	316	203	173	175	127	[d]63.0	119,000
1916	.....	[e]70.7	120	142	360	1,020	687	257	210	50	85.6	31.4	183,000
1917	19.7	21.4	16.8	49.2	510	863	489	155	103	96.1	96.1	40.2	149,000
Average	.....	.....	.....	.....	477	790	438	204	141	110	98.4	.....	.....
Median	.....	.....	.....	.....	510	863	402	189	123	96.1	91.9	.....	.....
Maximum	.....	.....	.....	.....	599	1,070	687	274	210	175	127	.....	.....
Minimum	.....	.....	.....	.....	360	473	316	155	103	50	85.6	.....	.....

[a] Dec. 1–15. [b] Apr. 18–30. [c] Apr. 24–30. [d] Dec. 1–15. [e] Feb. 6–29.

NOTE.—Average not computed if the monthly mean was not available for 5 years or more. The totals in acre-feet were not averaged because the records covered different periods in different years. The median flow given was obtained by arranging the monthly means in their order of magnitude and taking the middle mean, or, if their number was even, the average of the two middle means. By using daily discharge a somewhat lower median discharge would be obtained.

SWIFTCURRENT CREEK NEAR BABB, MONT.

LOCATION.—In sec. 28, T. 36 N., R. 14 W., near Babb, Mont.

DRAINAGE AREA.—101 square miles (at site of gage last used).

RECORDS AVAILABLE.—April 8, 1902, to May 13, 1910.

GAGE.—A wire gage about half a mile above mouth of creek used from April 8 until washed out by high water in June, 1902; it was replaced July 30, 1902, at a point 1,800 feet above the first site. Gage was again moved September 27, 1902, to a place 900 feet farther upstream, where it remained until destroyed by flood June 5, 1908. July 26, 1908, the gage was replaced 100 feet farther upstream.

DISCHARGE MEASUREMENTS.—Made from a cable or by wading.

CHANNEL AND CONTROL.—Bed composed of coarse gravel and boulders. Control shifted at high stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 6.0 feet June 21, 1909 (discharge, 3,360 second-feet); minimum stage, 1.6 feet February 21–28, 1906 (discharge, not computed).

ICE.—Stage-discharge relation usually affected by ice during the winter months.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation permanent except at high stages. Prior to September, 1907, observer not reliable. Records fair.

Discharge measurements of Swiftcurrent Creek near Babb, Mont., 1902–1910.

Date.	Made by—	Gage height.	Discharge.
1902.		*Feet.*	*Sec.-ft.*
Apr. 9	J. S. Baker	1.50	67
9	do	1.50	68
July 30	W. B. Freeman	2.50	418
Aug. 11	do	2.40	338
22	do	2.22	254
Sept. 2	do	1.94	170
Sept. 22	C. T. Prall	1.85	113
29	do	2.05	163
Oct. 8	W. B. Freeman	2.00	156
17	C. T. Prall	1.92	139
23	do	1.70	101
30	do	1.68	98
1903.			
May 9	F. M. Brown	2.87	430
June 3	C. T. Prall	5.40	2,473
20	do	4.75	1,546
26	do	4.35	1,260
July 3	do	3.90	1,030
9	do	3.85	964
18	do	3.50	745
25	do	3.50	718
Aug. 1	do	3.20	500
8	do	3.10	411
15	do	3.10	407
22	do	3.00	358
27	do	3.10	413
Sept. 26	do	4.23	1,266
Oct. 3	do	2.90	348
10	do	2.70	262
17	do	2.90	368
1904.			
May 9	L. R. Stockman	3.10	400
June 8	W. B. Freeman	4.51	1,290
July 12	Robert Follansbee	3.66	730
29	W. B. Freeman	3.07	387
Sept. 2	do	2.45	201
Nov. 18	L. R. Stockman	1.80	36
1905.		*Feet.*	*Sec.-ft.*
Apr. 26	Stockman and Morse	3.40	530
May 29	H. M. Morse	3.39	495
June 17	do	3.45	564
July 18	A. M. Crain	3.15	423
20	H. M. Morse	3.11	392
Aug. 11	A. M. Crain	3.03	357
Sept. 6	do	2.38	170
23	H. M. Morse	2.23	85
Nov. 17	W. B. Freeman	2.12	64
1906.			
Mar. 31	Freeman and Edson	2.08	48
May 12	W. B. Freeman	3.60	501
Aug. 18	Morse and Hartman	2.73	233
Sept. 14	Richards and Hartman	2.38	146
1907.			
Mar. 21	W. S. Hanna	2.18	120
May 14	J. E. Stewart	3.70	612
June 6	J. B. Pierson	4.85	1,460
July 3	do	4.85	1,500
Aug. 9	do	3.45	375
Sept. 6	Follansbee and Pierson	3.38	350
Oct. 26	L. R. Stockman	2.60	104
1908.			
Apr. 18	A. F. Huch	3.52	357
July 26	Stewart and Huch	3.45	408
Aug. 22	do	3.12	250
28	do	2.80	134
Oct. 8	A. F. Huch	2.67	95.8
1909.			
May 27	W. A. Lamb	4.83	1,890
June 13	do	4.23	1,220
July 7	do	3.95	958
Sept. 14	J. E. Stewart	2.72	143
17	do	2.67	129
Oct. 13	W. A. Lamb	2.76	147
1910.			
Apr. 21	W. A. Lamb	3.75	682

NOTE.—May 12, 1906, meter out of order; result probably low. Mar. 21, 1907, ice along both banks.

Daily discharge, in second-feet, of Swiftcurrent Creek near Babb, Mont., for 1902–1910.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1902.												
1				65	156	1,799	800	412	156	128	78	58
2				65	245	1,577	967	356	190	128	78	58
3				65	356	1,244	1,799	356	190	128	67	58
4				65	245	967	2,909	356	156	128	67	58
5				65	245	856	2,520	301	190	108	67	58
6				65	156	654	2,021	301	412	128	67	58
7				65	156	745	1,799	245	356	128	67	
8				67	156	745	1,633	190	190	128	67	
9				67	467	967	1,133	190	190	128	67	
10				67	578	1,133	800	356	190	128	67	
11				67	634	1,244	689	301	156	128	67	
12				67	634	1,244	689	301	156	128	67	
13				58	745	1,300	578	301	156	108	67	
14				58	745	967	578	301	128	108	67	
15				67	1,244	856	523	245	128	108	67	
16				78	1,300	800	523	245	156	108	67	
17				78	1,466	800	467	245	156	108	67	
18				78	1,466	745	467	245	128	92	67	
19				78	1,244	689	412	301	128	92	67	
20				108	1,466	689	356	301	128	92	67	
21				156	2,188	523	356	301	128	92	67	
22				190	1,744	467	301	245	128	92	67	
23				301	1,633	356	301	245	128	92	67	
24				301	1,411	245	356	245	128	92	67	
25				156	1,300	245	301	245	108	92	58	108
26				156	1,189	967	412	245	156	78	58	128
27				156	1,078	967	356	245	156	78	58	128
28				156	1,133	911	523	245	156	78	58	92
29				156	1,522	911	523	245	156	78	58	92
30				156	1,799	800	412	245	156	92	58	78
31					1,966		412	190		78		78

Daily discharge, in second-feet, of Swiftcurrent Creek near Babb, Mont., 1902–1910—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1903.												
1	.....	.....	.....	52	250	1,915	1,030	475	370	420	190	136
2	.....	.....	.....	45	285	2,210	880	420	325	420	190	219
3	.....	.....	.....	45	219	2,540	955	475	285	370	162	190
4	.....	.....	.....	45	250	2,360	880	420	285	325	162	162
5	.....	.....	.....	45	285	2,360	955	370	285	325	190	136
6	.....	.....	.....	45	325	2,450	955	370	250	285	190	162
7	.....	.....	.....	45	325	2,630	1,105	370	250	250	162	219
8	.....	.....	.....	45	370	2,630	955	420	219	250	162	190
9	.....	.....	.....	45	420	2,630	810	420	219	219	162	162
10	.....	.....	.....	45	475	2,020	740	475	285	250	600	162
11	.....	.....	.....	45	475	2,020	670	420	285	250	740	162
12	.....	.....	.....	40	600	2,020	740	420	325	325	740	162
13	.....	.....	.....	40	670	2,020	740	420	285	325	475	162
14	.....	.....	.....	40	880	2,020	740	420	250	325	475	162
15	.....	.....	.....	40	880	2,020	670	370	219	535	370	162
16	.....	.....	.....	45	1,030	2,020	670	370	219	325	325	162
17	.....	.....	.....	45	740	1,420	600	325	219	325	285	162
18	.....	.....	.....	45	535	1,745	600	370	219	325	285	162
19	.....	.....	.....	45	325	1,830	535	370	190	250	219	162
20	.....	.....	.....	52	162	1,660	535	370	285	219	190	162
21	.....	.....	.....	58	219	1,420	600	370	325	219	162	162
22	.....	.....	.....	92	219	1,340	600	325	370	219	136	162
23	.....	.....	.....	108	250	1,340	670	325	600	219	162	162
24	.....	.....	.....	156	285	1,180	670	325	880	219	162	162
25	.....	.....	.....	250	325	1,180	670	370	1,340	190	162	162
26	.....	.....	.....	285	420	1,260	600	370	1,340	190	162	162
27	.....	.....	.....	285	475	1,260	535	420	955	190	136	162
28	.....	.....	.....	325	475	1,745	535	370	535	190	112	162
29	.....	.....	.....	285	535	1,915	475	370	535	190	112	162
30	.....	.....	.....	250	535	1,340	420	370	475	219	112	162
31	.....	.....	.....	.....	1,180	.....	420	370	.....	219	.....	162
1904.												
1	.....	.....	.....	60	740	1,120	653	338	250	100	50	19
2	.....	.....	.....	60	740	1,030	719	338	226	100	50	19
3	.....	.....	.....	60	670	948	785	338	226	100	32	15
4	.....	.....	.....	60	600	866	719	338	200	100	32	15
5	.....	.....	.....	70	600	950	653	338	200	126	22	19
6	.....	.....	.....	70	535	1,210	653	338	200	126	22	38
7	.....	.....	.....	90	535	1,350	653	338	200	100	22	38
8	.....	.....	.....	136	475	1,350	719	338	200	100	22	38
9	.....	.....	.....	162	475	1,210	719	338	176	100	22	38
10	.....	.....	.....	162	475	1,080	719	304	176	76	22	38
11	.....	.....	.....	162	475	851	653	304	176	76	22	38
12	.....	.....	.....	219	475	851	653	304	176	76	22	25
13	.....	.....	.....	250	420	719	588	304	176	76	22	25
14	.....	.....	.....	250	420	719	588	304	126	76	22	25
15	.....	.....	.....	285	475	719	528	276	126	76	32	25
16	.....	.....	.....	285	670	785	475	276	126	76	32	25
17	.....	.....	.....	285	670	950	425	276	126	76	32	25
18	.....	.....	.....	285	740	950	425	276	126	76	32	25
19	.....	.....	.....	250	880	950	425	250	126	76	25	25
20	.....	.....	.....	250	880	1,080	425	338	126	76	38	25
21	.....	.....	.....	285	955	950	378	338	126	76	63	25
22	.....	.....	.....	285	1,180	950	378	338	126	50	113	19
23	.....	.....	.....	325	1,500	950	378	304	126	50	113	19
24	.....	.....	.....	325	1,180	851	378	304	100	32	113	19
25	.....	.....	.....	370	1,030	719	378	276	100	22	88	19
26	.....	.....	.....	475	880	653	338	226	100	32	88	19
27	.....	.....	.....	600	880	528	338	200	100	50	38	19
28	.....	.....	.....	740	810	528	338	200	100	50	25	19
29	.....	.....	.....	740	880	588	338	200	100	50	25	19
30	.....	.....	.....	810	955	588	338	200	100	76	19	19
31	.....	.....	.....	.....	1,030	.....	338	226	.....	76	.....	19

Daily discharge, in second-feet, of Swiftcurrent Creek near Babb, Mont., 1902–1910—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1905.												
1	.....	.....	88	38	300	800	600	340	130	190	130	.....
2	.....	.....	113	38	300	950	600	340	130	300	130	.....
3	.....	.....	163	63	260	1,025	600	340	130	435	105	.....
4	.....	.....	163	63	260	1,255	665	340	130	665	105	.....
5	.....	.....	163	63	260	1,255	665	300	105	665	105	.....
6	.....	.....	163	88	225	1,255	665	300	105	600	80	.....
7	.....	.....	163	88	225	1,255	600	300	105	540	80	.....
8	.....	.....	188	88	260	1,175	600	300	105	540	80	.....
9	.....	.....	188	113	340	1,175	600	300	105	340	60	.....
10	.....	.....	188	138	340	1,100	600	300	105	300	60	.....
11	.....	.....	213	163	435	1,025	600	300	105	300	60	.....
12	.....	.....	163	163	385	875	540	300	105	260	60	.....
13	.....	.....	163	163	385	875	540	300	130	225	60	.....
14	.....	.....	113	163	385	800	485	300	105	225	60	.....
15	.....	.....	113	163	385	730	485	300	105	190	60	.....
16	.....	.....	113	138	340	665	435	260	105	190	44	.....
17	.....	.....	63	138	340	800	435	260	105	190	44	.....
18	.....	.....	63	138	435	485	385	225	105	160	44	.....
19	.....	.....	63	138	435	485	385	190	80	160	44	.....
20	.....	.....	63	138	485	435	385	190	60	130	44	.....
21	.....	.....	63	113	730	540	385	190	60	130	60	.....
22	.....	.....	63	113	730	485	385	160	44	130	60	.....
23	.....	.....	63	163	730	485	385	160	44	160	60	.....
24	.....	.....	63	163	665	485	385	160	44	160	60	.....
25	.....	.....	63	557	540	485	385	160	60	190	60	.....
26	.....	.....	63	686	540	485	385	160	60	190	60	.....
27	.....	.....	63	557	540	485	385	160	105	225	60	.....
28	.....	.....	63	400	540	485	385	160	105	225	60	.....
29	.....	.....	63	355	540	540	340	160	130	190	60	.....
30	.....	.....	38	320	540	540	340	130	130	190	.....	.....
31	.....	.....	38	.....	540	.....	340	130	.....	160	.....	.....
1906.												
1	.....	.....	16	60	435	485	540	225	260	130	435	190
2	.....	.....	16	60	385	485	485	225	260	130	340	160
3	.....	.....	16	80	385	600	485	225	225	160	300	130
4	.....	.....	16	80	435	875	485	225	225	160	300	130
5	.....	.....	22	105	485	800	540	225	225	190	300	105
6	.....	.....	22	130	485	665	540	190	225	225	300	105
7	.....	.....	32	160	435	600	540	190	190	190	260	105
8	.....	.....	32	190	435	600	540	190	190	190	260	105
9	.....	.....	32	260	385	600	485	190	190	190	260	60
10	.....	.....	32	260	485	665	485	160	225	190	260	60
11	.....	.....	30	260	540	800	485	160	225	225	300	44
12	.....	.....	30	225	665	875	485	160	190	225	300	44
13	.....	.....	30	225	665	1,025	435	160	160	225	300	44
14	.....	.....	30	190	665	875	435	160	130	225	340	44
15	.....	.....	30	225	730	730	385	190	130	225	340	44
16	.....	.....	30	225	730	600	385	190	130	225	385	44
17	.....	.....	30	260	600	600	340	190	105	225	485	44
18	.....	.....	30	260	540	540	340	190	105	225	435	44
19	.....	.....	30	300	385	540	340	190	105	225	385	44
20	.....	.....	30	300	385	485	300	225	80	225	385	32
21	.....	.....	30	340	435	485	300	225	80	300	340	32
22	.....	.....	30	485	435	485	300	260	80	340	340	22
23	.....	.....	30	600	485	485	260	260	80	340	300	22
24	.....	.....	30	600	485	485	260	260	80	435	260	22
25	.....	.....	30	600	485	485	260	300	80	665	260	22
26	.....	.....	32	540	485	540	260	300	105	730	260	16
27	.....	.....	44	540	485	540	225	300	105	875	225	16
28	.....	.....	44	485	485	540	225	260	105	875	190	16
29	.....	.....	44	485	485	600	225	260	105	875	190	16
30	.....	.....	60	435	485	600	225	260	130	730	190	16
31	.....	.....	60	.....	485	.....	225	260	.....	600	.....	16

Daily discharge, in second-feet, of Swiftcurrent Creek near Babb, Mont., 1902–1910—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec
1907.												
1				90	166	800	1,320	415	470	280	82	51
2				90	190	880	1,320	415	470	242	82	51
3				90	166	965	1,320	415	470	242	82	51
4				106	166	1,050	1,230	415	415	242	82	51
5				90	190	1,230	1,230	415	415	208	82	39
6				90	274	1,420	1,230	415	366	208	82	39
7				106	244	1,520	1,230	415	366	208	82	39
8				166	306	1,620	1,230	415	366	208	82	39
9				144	417	1,520	1,140	415	321	208	65	39
10				166	605	1,520	1,140	415	321	208	65	39
11				190	660	1,420	1,140	470	321	177	65	39
12				244	720	1,420	1,050	415	366	177	65	51
13				244	850	1,420	1,050	415	366	149	51	51
14				244	995	1,320	1,050	366	366	149	51	51
15				244	995	1,320	1,050	366	366	149	51	51
16				244	1,230	1,420	965	366	366	149	51	51
17				216	1,420	1,420	965	321	366	149	51	51
18				216	1,520	1,420	880	321	366	149	51	51
19				190	1,320	1,620	880	321	415	124	51	29
20				216	1,230	1,620	800	280	415	124	51	29
21				190	1,070	1,730	725	280	415	124	51	29
22				190	785	1,840	655	280	366	102	51	29
23				166	660	1,840	655	280	415	102	51	29
24				190	605	1,840	590	242	415	102	51	29
25				166	554	1,840	590	242	415	102	51	39
26				166	605	1,840	530	321	415	102	51	39
27				166	660	1,840	530	366	366	102	51	39
28				190	720	1,840	470	530	366	102	51	39
29				166	720	1,840	470	530	366	102	51	39
30				166	920	1,840	415	530	366	82	51	39
31					1,150		415	590		82		39
1908.												
1				39	590	1,570	580	239	133	118	165	
2				39	530		580	239	118	118	165	
3				39	530	1,620	600	200	104	118	165	
4				39	590		600	200	104	118	133	
5				39	840		720	200	104	104	133	
6				39	965		730	182	104	104	118	
7				39	965		720	182	118	104	118	
8				39	1,050		620	165	118	97	118	
9				65	965		620	149	133	97	104	
10				65	880		640	133	133	104	104	
11				65	922		640	133	133	104	80	
12				107	922		640	165	133	104	70	
13				149	922		620	165	133	104	61	
14				196	1,010		720	182	118	133	61	
15				242	945		640	165	104	165	61	
16				300	880		730	149	104	182	80	
17				357	768		620	149	118	200	70	
18				415	655		620	133	133	239	70	
19				648	655		570	165	149	239	70	
20				880	655		560	200	133	380	88	
21				735	655		500	220	133	551	80	
22				590	655		450	220	133	434	70	
23				624	728		450	200	133	354	70	
24				657	800		450	200	133	282	61	
25				690	861		430	165	118	282	61	
26				590	922		407	165	104	329	61	
27				470	861		354	133	104	282	61	
28				590	800		329	133	104	282	61	
29				590	840		282	118	80	239	61	
30				655	880		282	133	80	239	61	
31					1,220		260	133		239		

Daily discharge, in second-feet, of Swiftcurrent Creek near Babb, Mont., 1902–1910—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1909.												
1				85	464	2,010	1,330	1,780	250	95	78	
2				90	518	2,250	1,400	1,560	260	92	70	
3				95	518	2,640	1,500	1,040	270	88	160	
4				105	518	2,440	1,360	995	250	85	290	
5				101	595	1,890	1,220	700	240	85	410	
6				98	595	1,720	1,080	500	240	82	345	
7				95	518	1,780	945	460	250	78	270	
8				95	445	2,010	832	430	260	86	195	
9				95	445	2,250	720	415	250	95	195	
10				95	378	1,890	678	400	230	112	130	
11				95	318	1,780	678	375	200	130	118	
12				95	218	1,660	635	350	180	138	105	
13				95	178	1,660	518	350	155	145	105	
14				95	240	1,610	518	350	130	132	88	
15				95	218	1,660	410	350	126	118	70	
16				95	332	1,660	410	340	122	118	70	
17				96	445	1,660	410	340	118	105	71	
18				97	445	1,780	345	330	132	95	73	
19				99	635	1,950	265	330	145	95	74	
20				100	595	2,760	265	320	138	95	75	
21				110	765	3,360	160	320	130	85	76	
22				103	900	3,160	95	310	130	95	77	
23				105	900	3,100	95	300	130	85	78	
24				109	948	3,030	218	290	124	85		
25				113	1,090	2,760	218	280	118	85		
26				118	1,240	2,380	678	270	112	85		
27				148	1,890	2,010	765	260	105	85		
28				178	1,890	1,780	855	250	95	78		
29				265	1,890	1,620	1,720	250	100	78		
30				410	1,780	1,340	1,890	250	105	85		
31					1,780		2,070	250		82		

Day.	Mar.	Apr.	May.	Day.	Mar.	Apr.	May.
1910.				1910.			
1		165	520	16	110	370	
2		130	460	17	110	370	
3		130	370	18	130	370	
4		130	340	19	130	460	
5		130	370	20	165	670	
6		165	460	21	240	750	
7		165	470	22	290	630	
8		165	1,030	23	340	520	
9		165	1,140	24	290	520	
10		290	1,030	25	290	670	
11		340	840	26	240	890	
12		400	710	27	205	1,030	
13	90	460	630	28	205	1,030	
14	90	460		29	165	890	
15	90	430		30	165	670	
				31	165		

NOTE.—1902: No gage heights reported Apr. 1–7: discharge estimated.

1903: Stage discharge relation possibly affected by ice but open-channel rating curve used to determine discharge Jan. 1 to Mar. 31; affected by ice, discharge estimated, Dec. 11–31. Gage washed out June 8–16; discharge estimated.

1904: Stage-discharge relation affected by ice Jan. 1–11, Jan. 20 to Apr. 4, and Dec. 22–31. Daily discharge June 1 to Dec. 31 recomputed.

1905: Stage-discharge relation affected by ice Jan. 1 to Feb. 24 and Nov. 26 to Dec. 31. Daily discharge Jan. 1 to Apr. 30 recomputed.

1906: Stage-discharge relation affected by ice Jan. 1 to Feb. 20 and Mar. 11–25.

1907: Stage-discharge relation affected by ice Jan. 1 to Mar. 31. Originally published estimate of mean discharge for March revised in accordance with discharge measurement made Mar. 21, and measurements of St. Mary River at dam site Mar. 20 and Mar. 30.

1908: Stage-discharge relation affected by ice Jan. 1 to Mar. 31 and Nov. 29 to Dec. 31. Estimates of mean discharge for January, February, March, November, and December, 1908, have been revised in accordance with estimated discharge of St. Mary River above Swiftcurrent Creek. Gage washed out June 4 and new one installed July 26 at different section; mean discharge for June and daily discharge July 1–25 estimated.

1909: No gage heights reported June 27 to July 7 and Aug. 5 to Sept. 13, 1909; discharge estimated. There were also many single days and periods of two or three days for which gage heights were missing and discharge interpolated. Discharge for 1909, especially that for May, appears high when compared with the discharge of St. Mary River above Swiftcurrent Creek; both gages read by the same man; records at both stations somewhat doubtful.

1910: Stage-discharge relation affected by ice Jan. 1 to Mar. 12; discharge Mar. 1–12 estimated at 55 second-feet.

For full months in which the stage-discharge relation was affected by ice estimates appear in the tables of monthly discharge; for parts of months the daily discharge or the monthly mean discharge was estimated.

Monthly discharge of Swiftcurrent Creek near Babb, Mont., 1902–1910.

[Drainage area, 101 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1902.						
April			109	1.08	1.20	6,485
May	1,966	155	989	9.79	11.30	60,811
June	1,799	245	880	8.71	9.71	52,360
July	2,909	301	836	8.28	9.55	51,404
August	412	190	276	2.73	3.15	16,971
September	412	108	168	1.66	1.85	9,996
October	128	78	106	1.05	1.21	6,517
November	78	58	66	.65	.73	3,927
The period						208,000
1903.						
January			50	.50	.58	3,074
February			46	.46	.48	2,555
March			50	.50	.58	3,074
April	325	40	100	.99	1.10	5,950
May	1,180	162	465	4.60	5.30	28,592
June	2,630	1,180	1,885	18.66	20.82	112,165
July	1,105	420	708	7.01	8.08	43,532
August	475	325	389	3.85	4.44	23,918
September	1,340	190	421	4.17	4.65	25,052
October	535	190	277	2.74	3.16	17,033
November	740	112	256	2.53	2.82	15,233
December	219	136	166	1.64	1.89	10,207
The year	2,630	40	401	3.97	53.90	290,385
1904.						
January			50	.50	.58	3,070
February			40	.40	.43	2,300
March			40	.40	.46	2,460
April	810	60	280	2.77	3.09	16,700
May	1,500	420	749	7.42	8.55	46,100
June	1,350	528	900	8.91	9.94	53,600
July	785	338	519	5.14	5.93	31,900
August	338	200	292	2.89	3.33	18,000
September	250	100	151	1.50	1.67	8,980
October	126	22	75.9	.751	.87	4,670
November	113	19	42.0	.416	.46	2,500
December	38	19	24.4	.242	.28	1,500
The year	1,500		264	2.61	35.59	191,700
1905.						
January			20	.198	.228	1,230
February			20	.198	.206	1,111
March	213	38	108	1.07	1.23	6,640
April	686	38	190	1.88	2.10	11,300
May	730	225	433	4.29	4.95	26,620
June	1,255	435	781	7.73	8.62	46,470
July	665	340	483	4.78	5.51	29,700
August	340	130	242	2.40	2.77	14,880
September	130	44	98	.969	1.08	5,825
October	665	130	276	2.73	3.15	16,970
November	130	44	66	.658	.734	3,957
December			50	.495	.571	3,074
The year	1,255		232	2.30	31.15	167,784
1906.						
January			30	.297	.34	1,840
February			30	.297	.31	1,670
March	60	16	31.3	.310	.36	1,920
April	600	60	299	2.96	3.30	17,800
May	730	385	500	4.95	5.71	30,700
June	1,020	485	623	6.17	6.88	37,100
July	540	225	381	3.77	4.35	23,400
August	300	160	220	2.18	2.51	13,500
September	260	80	151	1.50	1.67	8,980
October	875	130	347	3.44	3.97	21,300
November	485	190	308	3.05	3.40	18,300
December	190	16	57.9	.573	.66	3,560
The year	1,020	16	249	2.47	33.43	180,000

Monthly discharge of Swiftcurrent Creek near Babb, Mont., 1902–1910—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1907.						
January	.....	.....	50	0.495	0.57	3,070
February	.....	.....	65	.644	.67	3,610
March	.....	.....	80	.792	.91	4,920
April	244	90	171	1.69	1.89	10,200
May	1,520	166	713	7.06	8.14	43,800
June	1,840	800	1,510	15.0	16.69	89,800
July	1,320	415	912	9.03	10.41	56,100
August	590	242	387	3.83	4.42	23,800
September	470	321	387	3.83	4.27	23,000
October	280	82	157	1.55	1.79	9,650
November	82	51	61.1	.605	.68	3,640
December	51	29	41.3	.409	.47	2,540
The year	1,840	.....	378	3.74	50.91	274,000
1908.						
January	.....	.....	31	.307	.35	1,910
February	.....	.....	60	.594	.64	3,450
March	.....	.....	102	1.01	1.16	6,270
April	880	39	333	3.30	3.68	19,800
May	1,220	530	821	8.13	9.37	50,500
June	.....	1,570	1,940	19.2	21.42	115,000
July	730	260	547	5.42	6.25	33,600
August	239	118	171	1.69	1.95	10,500
September	149	80	118	1.17	1.30	7,020
October	551	97	208	2.06	2.38	12,800
November	165	61	89.1	.872	.97	5,300
December	.....	.....	50	.495	.57	3,070
The year	.....	.....	372	3.68	50.04	269,000
1909.						
April	410	85	119	1.18	1.32	7,080
May	1,890	178	764	7.56	8.72	47,000
June	3,360	1,340	2,120	21.0	23.43	126,000
July	2,070	95	783	7.75	8.94	48,100
August	1,780	250	476	4.71	5.43	29,300
September	270	95	170	1.68	1.87	10,100
October	145	78	96.7	.957	1.10	5,950
November 1–23	410	70	140	1.39	1.19	6,390
The period	.....	.....	.....	.....	.....	280,000
1910.						
January	.....	.....	40	.396	.46	2,460
February	.....	.....	45	.446	.46	2,500
March	.....	.....	135	1.34	1.54	8,300
April	1,030	130	452	4.47	4.99	26,900
May 1–13	1,140	340	659	6.52	3.15	16,900
The period	.....	.....	.....	.....	.....	57,060

NOTE.—Estimates June 1, 1904, to Apr. 30, 1905; March and December, 1906; March, 1907; January, February, March, November, and December, 1908, have been revised. See footnote to daily discharge.

Mean monthly discharge, in second-feet, of Swiftcurrent Creek near Babb, Mont., 1902–1910.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total in acre-feet.
1902	.....	.....	.....	109	989	880	836	276	168	106	66	.....	a208,000
1903	50	46	50	100	465	1,885	708	389	421	277	256	166	290,000
1904	b50	b40	b40	280	749	900	519	292	151	75.9	42.0	23.7	191,700
1905	b20	b20	108	190	433	781	483	242	98	276	66	50	167,800
1906	b30	b30	b31.3	299	500	623	381	220	151	347	308	57.9	180,000
1907	b50	b65	b80	171	713	1,510	912	387	387	157	61.1	41.3	274,000
1908	b31	b60	b102	333	821	b1,940	547	171	118	208	89.1	b50	269,000
1909	.....	.....	.....	119	764	2,120	783	476	170	96.7	c140	.....	a280,000
1910	b40	b45	135	452	659	.....	.....	.....	.....	.....	.....	.....	.....
Average	38.7	43.7	78.0	228	677	1,330	646	307	208	193	129	64.8	229,000
Median	40	45	80	190	713	1,200	628	284	160	182	77.6	50	230,000
Maximum	50	65	135	452	989	2,120	912	476	421	347	308	166	290,000
Minimum	20	20	31.3	100	433	623	381	171	98	75.9	42	23.7	168,000

a Not included in average.
b Estimated.
c Nov. 1–23. Assumed mean for the month in computing average.

NOTE.—The median flow given was obtained by arranging the monthly means in their order of magnitude and taking the middle mean, or, if their number was even, the average of the two middle means. By using daily discharge a somewhat lower median discharge would be obtained.

KENNEDY CREEK NEAR BABB, MONT.

LOCATION.—In sec. 34, T. 37 N., R. 14 W., 50 feet above the road from Babb, Mont., to Cardston, Alta., Canada, and about 2 miles north of Babb.

DRAINAGE AREA.—50 square miles (measured on topographic maps).

RECORDS AVAILABLE.—Some discharge measurements in 1903–1912, and monthly estimates based on discharge measurements and scattered gage readings for June, July, August, and September, 1905.

DISCHARGE MEASUREMENTS.—Made from cable.

CHANNEL AND CONTROL.—Bed composed of boulders; would shift only during floods.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Estimates of mean discharge for June, July, August, and September, 1905, given in a footnote to the table of daily gage heights, are based on a few scattered gage-height observations and several discharge measurements. As this stream is fed by melting snow its flow is fairly constant and the estimates are fair.

Discharge measurements of Kennedy Creek near Babb, Mont., 1903–1907, 1911–12.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1903.		*Feet.*	*Sec.-ft.*	1905.		*Feet.*	*Sec.-ft.*
July 25	C. T. Prall	6.30	208	Nov. 17	W. B. Freeman	5.70	31
Aug. 1	do	6.20	164				
8	do	6.10	136	1906.			
15	do	6.10	138	Mar. 31	Freeman and Edson	5.74	28.7
22	do	6.00	114	May 12	W. B. Freeman	6.38	17.2
Oct. 3	do	5.95	102	Aug. 18	Morse and Hartman	5.78	49.4
10	do	5.85	84	Sept. 14	Richards and Hartman	5.91	66.4
17	do	5.85	91				
1904.				1907.			
May 9	L. R. Stockman	6.13	145	May 14	J. E. Stewart	6.26	240
June 8	W. B. Freeman	6.63	337	June 6	J. B. Pierson	6.95	979
July 12	Robert Follansbee	6.40	165	July 2	do	7.10	919
30	W. B. Freeman	6.03	82	Aug. 8	do	6.25	152
Sept. 3	do	5.87	48	Sept. 7	Follansbee and Pierson	6.11	87
Nov. 18	L. R. Stockman	5.61	26				
1905.				1911.			
				May 5	B. E. Jones	.....	171
Apr. 27	Stockman and Morse	6.10	103	July 18	W. A. Lamb	.....	153
May 29	H. M. Morse	6.19	120	Aug. 26	B. E. Jones	.....	81
June 16	do	6.35	221	Oct. 12	do	.....	94
July 19	Morse and Crain	6.15	126	1912.			
Aug. 11	A. M. Crain	5.96	77	June 7	W. A. Lamb	.....	179
Sept. 5	do	5.75	35	Aug. 16	do	.....	55
23	H. M. Morse	5.65	27				

NOTE.—May 12, 1906, meter probably out of order; results may be low.

Daily gage height, in feet, of Kennedy Creek near Babb, Mont., 1905.

Date.	June.	July.	Aug.	Sept.	Date.	June.	July.	Aug.	Sept.
1		6.6		5.8	16	6.4		5.9	
2			6.03		17				
3					18				
4				5.75	19		6.15	5.85	
5			5.94	5.75	20				
6		6.5			21				
7					22				
8					23		6.1	5.8	5.65
9			5.9		24	6.5			
10				5.7	25			5.8	
11			5.96		26		6.0		
12		6.4			27	6.6			
13	6.5				28			5.75	
14			5.9		29	6.55	6.0		
15					30			5.75	
					31		6.05		

NOTE.—Mean monthly discharge estimated as follows for 1905: June, 320 second-feet; July, 203 second-feet; August, 58 second-feet; September, 31 second-feet.

BOUNDARY CREEK AT FIDLER'S RANCH, ALTA.

LOCATION.—In the SW. ¼ sec. 20, T. 1, R. 26 W. fourth meridian, 800 feet southeast of Boundary Creek post office and 16 miles southwest of Cardston, Alta.

DRAINAGE AREA.—44 square miles.

RECORDS AVAILABLE.—Open-water periods June 18, 1913, to October 31, 1917.

GAGE.—Vertical staff nailed to post driven into bed of stream and braced to left bank. Read by James Fidler.

DISCHARGE MEASUREMENTS.—Made by wading or from temporary pole bridge.

CHANNEL AND CONTROL.—Bed composed of gravel and sand. Banks fairly high; subject to overflow at extremely high stages. One channel at all stages. Control permanent.

EXTREMES OF DISCHARGE.—1913–1917: Maximum stage recorded, 3.50 feet June 4, 1915 (discharge, 277 second-feet); minimum stage recorded, 0.53 foot April 4 and 6, 1914 (no discharge).

ICE.—Station not maintained during winter.

ACCURACY.—Stage-discharge relation permanent except when slightly affected by vegetable growth. Rating curves fairly well defined. Records considered good.

Discharge measurements of Boundary Creek at Fidler's ranch, Alta., 1913–1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1913.		*Feet.*	*Sec.-ft.*	1915.		*Feet.*	*Sec.-ft.*
June 18	F. R. Burfield	1.74	12.7	June 22	V. A. Newhall	2.27	59.0
July 28	do	1.71	12.1	July 10	do	2.14	41.0
Aug. 13	do	1.66	9.6	Aug. 7	do	2.07	36.0
Sept. 3	do	1.59	5.8	Sept. 8	do	1.91	19.8
Oct. 29	L. Danielsen	1.65	8.5	Oct. 18	do	2.00	25.0
Nov. 7	do	1.77	13.1	1916.			
1914.				Apr. 15	S. H. Frame	1.78	32.0
Mar. 31	O. H. Hoover	2.56	13.4	May 13	do	1.78	32.0
Apr. 14	do	1.82	18.9	June 17	do	1.96	40.0
May 6	do	1.86	22.0	July 21	do	1.65	18.7
26	do	1.72	13.2	Aug. 22	do	1.49	11.6
June 12	do	1.51	5.1	Sept. 25	do	1.40	6.6
July 2	do	1.49	4.1	1917.			
27	do	1.42	2.8	Apr. 24	A. W. P. Lowrie		21.0
Aug. 18	do	1.60	6.4	May 17	do	2.08	69.0
Sept. 25	do	1.51	3.0	June 30	do	1.63	23.0
Nov. 6	do	1.66	9.8	July 25	do	1.35	7.8
1915.				Aug. 29	do	1.26	5.1
Apr. 26	V. A. Newhall	1.70	12.4	Oct. 19	do	1.34	7.9

Daily discharge, in second-feet, of Boundary Creek at Fidler's ranch, Alta., 1913–1917.

Day.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	June.	July.	Aug.	Sept.	Oct.	Nov.
1913.													
1	.....	26.0	13.1	8.7	9.7	10.2	16	.....	12.1	10.2	8.7	11.2	11.2
2	.....	28.0	12.1	9.2	9.2	13.1	17	.....	11.2	9.7	7.2	11.6	11.2
3	.....	27.0	12.1	8.7	9.7	10.2	18	11.2	11.2	10.2	8.2	10.2	11.2
4	.....	11.2	10.2	8.7	10.2	11.2	19	12.1	11.2	9.7	9.2	9.7	8.7
5	.....	11.2	11.2	8.7	10.2	11.2	20	11.2	11.2	11.2	7.2	8.7	10.2
6	.....	11.2	12.1	8.7	9.7	11.2	21	11.2	11.2	10.2	8.7	9.2	11.2
7	.....	11.2	11.2	8.2	10.7	9.7	22	26.0	10.2	10.2	9.2	9.2	8.7
8	.....	12.1	13.1	8.2	10.7	7.2	23	27.0	10.7	9.7	9.2	9.7	8.7
9	.....	12.1	14.1	8.7	10.2	8.2	24	27.0	11.2	9.2	8.7	9.7	8.7
10	.....	11.2	12.6	9.7	9.7	8.2	25	27.0	12.1	8.7	8.2	9.7	3.8
11	.....	26.0	12.1	9.2	12.1	9.7	26	27.0	10.2	8.2	9.2	9.7	3.8
12	.....	11.2	10.2	8.2	13.1	9.7	27	27.0	10.7	9.2	9.2	10.2	3.8
13	.....	11.6	11.2	7.7	13.1	9.7	28	26.0	12.1	8.2	8.2	10.2	3.8
14	.....	11.2	11.2	8.2	12.1	10.2	29	26.0	13.1	8.7	8.7	8.7	8.7
15	.....	11.2	12.1	7.7	13.1	10.2	30	27.0	12.1	9.7	9.2	10.2	8.7
							31	.....	11.2	9.7	.....	9.7	.....

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1914.								
1	.....	35.0	16.3	10.5	2.8	2.1	3.8	3.2
2	.....	4.9	16.3	7.7	2.8	2.0	3.8	3.6
3	.....	Nil.	15.1	5.7	4.1	1.9	3.4	3.6
4	.....	Nil.	16.3	7.0	3.6	1.8	3.1	3.9
5	.....	Nil.	16.9	10.1	4.1	1.7	3.1	4.0
6	.....	Nil.	21.0	10.5	4.1	1.7	3.4	4.0
7	.....	22.0	22.0	9.6	4.4	1.5	3.4	4.3
8	.....	31.0	27.0	9.2	4.4	1.5	3.8	4.3
9	.....	27.0	29.0	8.8	4.1	1.6	3.8	4.7
10	.....	15.7	23.0	7.7	3.6	1.7	3.4	5.4
11	.....	14.5	22.0	7.4	3.6	1.7	3.4	6.6
12	.....	14.0	20.0	7.0	3.2	1.7	4.1	12.6
13	.....	16.3	20.0	6.7	3.6	1.8	4.4	15.3
14	.....	17.5	19.0	6.7	11.0	1.8	4.1	16.0
15	.....	18.2	17.5	7.4	4.6	1.6	4.4	16.8
16	.....	18.2	16.9	12.4	3.4	1.6	4.1	14.7
17	.....	14.5	16.3	11.4	4.4	8.7	4.1	15.4
18	.....	12.9	15.1	10.1	4.1	8.6	4.1	16.8
19	.....	11.9	15.1	6.0	4.1	4.8	4.1	16.8
20	.....	11.9	16.3	6.0	4.1	4.8	4.1	17.6
21	.....	14.0	17.5	5.7	3.9	4.4	4.1	18.4
22	.....	16.3	16.3	6.0	3.9	4.4	3.8	19.2
23	.....	15.1	15.1	6.7	3.6	3.8	3.8	20.0
24	.....	14.0	15.1	7.0	3.6	4.8	3.8	17.7
25	.....	11.9	14.0	9.2	3.6	4.4	3.6	17.0
26	.....	11.9	14.0	14.0	3.4	4.1	3.4	17.0
27	.....	11.4	12.9	13.5	3.4	4.1	3.5	16.4
28	.....	11.9	11.9	9.2	3.1	3.8	3.5	15.8
29	.....	11.9	11.9	9.2	2.8	3.8	3.5	15.8
30	.....	11.4	11.4	9.2	2.6	3.4	3.2	15.5
31	.....	.....	11.0	.....	2.4	3.4	.....	15.5

Daily discharge, in second-feet, of Boundary Creek at Fidler's ranch, Alta., 1913–1917— Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1915.								
1	.....	14.3	29.0	18.2	104	66.0	16.9	20.0
2	.....	15.0	32.0	22.0	101	63.0	17.3	21.0
3	.....	15.4	30.0	68.0	95	57.0	18.2	26.0
4	.....	15.7	29.0	277.0	61	47.0	55.0	28.0
5	.....	16.5	29.0	111.0	54	40.0	35.0	28.0
6	.....	17.3	28.0	86.0	49	35.0	26.0	30.0
7	.....	17.3	25.0	86.0	47	32.0	24.0	29.0
8	.....	18.2	24.0	83.0	40	29.0	21.0	28.0
9	.....	18.2	22.0	79.0	40	28.0	23.0	26.0
10	.....	18.2	20.0	102.0	40	28.0	36.0	26.0
11	.....	18.2	19.1	108.0	34	26.0	34.0	26.0
12	.....	18.2	18.2	108.0	30	25.0	31.0	28.0
13	.....	17.7	17.3	86.0	29	25.0	29.0	28.0
14	.....	17.7	36.0	83.0	29	26.0	28.0	25.0
15	.....	17.7	41.0	90.0	28	25.0	26.0	28.0
16	.....	17.3	35.0	111.0	28	24.0	25.0	29.0
17	.....	17.3	35.0	111.0	33	24.0	24.0	28.0
18	19.5	16.9	40.0	104.0	122	22.0	23.0	26.0
19	19.1	16.5	41.0	101.0	106	24.0	24.0	26.0
20	20.0	15.7	36.0	76.0	44	29.0	24.0	25.0
21	20.0	15.4	33.0	57.0	40	27.0	22.0	24.0
22	20.0	15.0	31.0	60.0	36	26.0	21.0	23.0
23	19.5	14.3	29.0	54.0	30	24.0	21.0	22.0
24	20.0	13.7	28.0	52.0	29	22.0	22.0	22.0
25	15.0	13.7	28.0	86.0	30	21.0	22.0	21.0
26	14.3	12.4	24.0	111.0	69	20.0	22.0	21.0
27	14.3	11.8	22.0	113.0	69	19.1	22.0	22.0
28	14.3	11.3	21.0	88.0	69	18.2	22.0	21.0
29	14.0	11.3	20.0	61.0	73	18.2	22.0	20.0
30	13.7	11.6	20.0	54.0	69	17.3	21.0	19.5
31	13.7	.....	19.1	.....	66	17.3	.....	19.1
1916.								
1	.....	34.0	23	79	54.0	14.4	8.5	10.1
2	.....	35.0	25	79	52.0	13.4	8.5	10.5
3	.....	34.0	26	72	47.0	12.9	9.7	12.4
4	.....	32.0	26	70	42.0	12.0	11.0	13.9
5	.....	30.0	27	77	37.0	11.0	12.4	15.0
6	.....	31.0	28	79	34.0	10.5	12.9	13.4
7	.....	30.0	28	77	34.0	10.1	13.9	13.4
8	.....	29.0	26	72	33.0	9.7	13.9	12.9
9	.....	28.0	26	74	33.0	11.5	14.4	12.4
10	.....	27.0	25	78	33.0	13.4	13.9	12.0
11	.....	26.0	23	80	30.0	15.5	12.9	12.0
12	.....	26.0	25	74	28.0	17.6	13.9	11.5
13	.....	26.0	28	58	26.0	19.4	15.0	12.0
14	.....	27.0	30	54	24.0	18.2	15.0	12.9
15	.....	28.0	31	49	22.0	16.5	13.9	12.9
16	.....	23.0	32	44	21.0	15.0	13.9	13.9
17	.....	23.0	31	44	22.0	13.9	12.9	13.0
18	.....	22.0	30	37	23.0	16.0	12.0	15.0
19	.....	21.0	29	40	22.0	17.1	11.0	15.0
20	.....	21.0	28	43	21.0	12.4	10.1	16.0
21	.....	20.0	29	50	18.7	11.0	8.9	17.1
22	.....	19.4	31	49	18.2	10.5	8.5	17.1
23	.....	19.4	33	47	17.6	10.1	8.2	18.2
24	.....	19.4	35	43	17.1	9.3	7.8	18.2
25	.....	21.0	38	39	16.0	9.3	7.1	16.0
26	.....	21.0	41	46	16.5	8.9	8.5	13.9
27	45	21.0	44	62	17.1	8.5	8.9	13.9
28	43	22.0	47	62	18.2	8.5	8.5	14.4
29	41	23.0	53	67	17.1	7.8	9.3	13.9
30	37	23.0	58	66	16.0	7.8	9.7	13.9
31	35	.....	68	.....	15.5	7.8	.....	13.4

Daily discharge, in second-feet, of Boundary Creek at Fidler's ranch, Alta., 1912–1917—Continued.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1917.							1917.						
1	28	87	21	6.4	5.3	5.0	16	66	51	11.0	8.5	5.5	4.3
2	30	83	20	5.8	5.5	5.0	17	69	47	11.0	7.8	5.3	4.6
3	32	79	19.3	5.8	5.3	4.8	18	66	37	11.0	7.4	5.0	7.4
4	34	74	19.3	6.4	5.3	4.8	19	65	40	11.0	7.1	4.8	6.7
5	38	67	18.0	6.4	5.0	5.0	20	65	36	10.1	6.4	4.8	6.0
6	40	57	18.0	7.1	5.3	5.5	21	67	38	9.6	6.0	4.6	6.7
7	38	52	16.8	7.8	5.3	5.8	22	69	36	9.2	6.4	4.6	6.0
8	37	48	16.2	8.5	5.5	5.5	23	69	36	8.5	5.8	4.8	6.7
9	40	45	15.5	8.9	5.8	5.5	24	70	36	8.5	5.3	5.0	6.0
10	44	55	9.6	8.9	5.8	5.5	25	75	32	8.2	5.0	5.5	6.4
11	47	79	7.1	10.1	5.8	5.0	26	82	30	7.8	5.3	5.3	7.4
12	51	91	11.0	10.1	5.8	4.8	27	85	28	7.4	5.3	5.3	7.8
13	55	81	11.0	9.6	6.4	4.8	28	81	26	7.1	5.0	4.8	8.2
14	59	72	12.0	9.2	6.0	4.6	29	88	25	6.4	4.8	4.8	8.2
15	62	60	11.1	9.2	5.8	4.6	30	95	22	6.4	5.0	5.0	9.2
							31	101	.....	6.4	5.3	.....	9.6

NOTE.—1914: Shifting control July 28 to Aug. 17 and Sept. 26 to Oct. 31.
1917: Discharge estimated May 9–16.

Monthly discharge of Boundary Creek at Fidler's ranch, Alta, 1913–1917.

[Drainage area, 44 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1913.						
June 18–30	27.0	11.2	22.0	0.458	0.221	567
July	28.0	10.2	13.4	.279	.322	824
August	14.1	8.2	10.7	.223	.257	658
September	9.7	7.2	8.6	.179	.200	512
October	13.1	8.7	10.4	.217	.250	640
November	13.1	3.8	9.1	.190	.212	541
The period	.....	.....	.....	.....	1.642	3,742
1914.						
April 1–30	35.0	.0	13.8	.288	.32	821
May	29.0	11.0	17.2	.358	.41	1,058
June	14.0	5.7	8.6	.179	.20	512
July	11.0	2.4	3.9	.081	.09	240
August	8.7	1.5	3.2	.067	.08	197
September	4.4	3.1	3.7	.077	.09	220
October 1–31	20.0	3.2	12.2	.254	.29	750
The period	.....	.....	.....	.....	1.48	3,798
1915.						
March 18–31	20.0	13.7	17.0	.386	.201	472
April	18.2	11.3	15.7	.357	.398	934
May	41.0	17.3	27.8	.632	.729	1,709
June	277.0	18.2	88.2	.200	.223	5,248
July	122.0	28.0	54.6	1.241	1.431	3,357
August	66.0	17.3	29.2	.664	.766	1,795
September	55.0	16.9	25.2	.573	.639	1,500
October	30.0	19.1	24.7	.562	.648	1,519
The period	.....	.....	.....	.....	5.035	16,534
1916.						
March 27–31	45.0	35.0	40.0	.909	.17	397
April	35.0	19.4	25.0	.568	.63	1,488
May	68.0	23.0	33.0	.750	.86	2,029
June	80.0	37.0	60.0	1.360	1.52	3,570
July	54.0	15.5	27.0	.614	.71	1,660
August	19.4	7.8	12.3	.280	.32	756
September	15.0	7.1	11.2	.255	.28	666
October	18.2	10.1	14.0	.318	.37	861
The period	.....	.....	.....	.....	4.86	11,427
1917.						
May	101.0	28.0	60.0	1.360	1.57	3,689
June	91.0	22.0	52.0	1.180	1.32	3,094
July	21.0	6.4	11.8	.268	.31	725
August	10.1	4.8	7.0	.159	.18	430
September	6.4	4.6	5.3	.120	.13	315
October	9.6	4.3	6.0	.136	.16	369
The period	.....	.....	.....	.....	3.67	8,623

Mean monthly discharge, in second-feet, of Boundary Creek at Fidler's ranch, Alta., 1913–1917.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total in acre-feet.
1913	.....	.....	.....	a 22	13.0	11.0	9.0	10	9	a 3,742
1914	.....	14	17	9	4.0	3.0	4.0	12	.....	3,798
1915	a 17	16	28	88	55.0	29.0	25.0	25	.....	16,534
1916	a 40	25	33	60	27.0	12.0	11.0	14	.....	11,427
1917	.....	.....	60	52	11.8	7.0	5.3	6	.....	8,623
Average	.....	18	34	52	22	12.4	10.9	13.4	9.0	10,096
Average run-off, acre-feet	.....	1,071	2,091	3,094	1,353	762	649	824	536	10,380
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	236

a Incomplete record not included in average.

ROLPH CREEK NEAR TAYLORVILLE, ALTA.

LOCATION.—In SE. ¼ sec. 22, T. 1, R. 24 W. fourth meridian, on mail route from Cardston to Taylorville, at bridge where trail crosses Rolph Creek, 3 miles from Taylorville and 5 miles from Kimball.

DRAINAGE AREA.—36 square miles.

RECORDS AVAILABLE.—July 11 to November 30, 1917. At the original station near Kimball, SE. ¼ sec. 21, T. 2, R. 24 W. fourth meridian, May 17, 1911, to July 31, 1917 (see pp. 96–102).

GAGE.—Vertical staff, nailed to pile on left abutment of bridge. Read by Earl Shipley July 11 to August 24; by F. J. Nielsen August 27 to November 30.

DISCHARGE MEASUREMENTS.—Made by wading 100 feet upstream from gage or from bridge.

CHANNEL AND CONTROL.—Gravel; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded in 1917, 1.67 feet September 9 and 10 (discharge, 15.8 second-feet); minimum stage recorded, 1.20 feet October 11–15 (discharge, 2.9 second-feet).

1911–1916 (station near Kimball): Maximum stage recorded, 2.75 feet June 26, 1915 (discharge, 210 second-feet); minimum stage recorded 0.40 foot July 6, 1912, and in May, June, July, and August, 1914 (no flow).

ICE.—Stage-discharge relation affected by ice and snow. Observations discontinued during winter months.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve well defined between 2.9 and 12.6 second-feet. Gage read to hundredths daily. Daily discharge ascertained by applying daily gage height to rating tables. Records good.

Discharge measurements of Rolph Creek near Taylorville Alta., 1917.

[Made by A. W. P. Lowrie.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
May 6	.....	a 33.0	July 27	1.54	10.3	Sept. 19	1.52	9.4
July 12	1.51	8.7	Aug. 25	1.58	11.8	Oct. 15	1.20	2.9

a Made at NE. ¼ sec. 35, T. 1, R. 24 W. fourth meridian, previous to installation of new station at SE. ¼ sec. 22, T. 1, R. 24 W. fourth meridian.

Daily discharge, in second-feet, of Rolph Creek near Taylorville, Alta., 1917.

Day.	July.	Aug.	Sept.	Oct.	Nov.	Day.	July.	Aug.	Sept.	Oct.	Nov.
1	.....	8.0	13.6	4.2	3.0	16	7.6	10.9	12.7	3.1	5.3
2	.....	7.8	14.9	3.9	3.0	17	7.4	10.9	10.9	3.1	5.1
3	.....	7.6	14.5	3.9	6.0	18	7.2	9.8	9.0	3.3	5.1
4	.....	7.7	14.0	3.9	8.6	19	6.9	8.7	9.4	3.0	5.1
5	.....	7.8	14.5	3.7	8.6	20	6.6	7.6	7.0	3.0	4.9
6	.....	8.0	14.5	3.4	9.7	21	6.3	8.1	6.2	3.0	4.9
7	.....	8.3	14.9	3.2	9.0	22	6.0	8.6	6.2	3.0	4.7
8	.....	8.6	15.3	3.1	8.6	23	5.7	8.4	6.2	3.0	4.7
9	.....	9.0	15.8	3.1	7.3	24	6.4	8.3	5.3	3.0	4.7
10	.....	9.4	15.8	3.0	6.2	25	7.0	11.8	6.0	3.0	4.7
11	8.6	10.2	15.3	2.9	6.2	26	8.5	12.2	5.7	3.0	4.7
12	9.0	11.0	15.3	2.9	5.5	27	10.1	12.7	5.3	3.0	4.5
13	8.0	11.8	14.5	2.9	5.3	28	9.0	12.7	4.9	3.0	4.5
14	8.0	11.3	13.6	2.9	5.3	29	7.9	13.1	4.5	3.0	4.4
15	7.8	10.9	13.6	2.9	5.3	30	6.7	13.6	4.2	3.0	4.2
						31	7.3	14.9	.....	3.0	.....

NOTE.—Stage-discharge relation affected by ice Oct. 19. Discharge estimated for following periods: July 15–22, 24, 26, 28, 29, 31; Aug. 2, 4, 5, 7, 9, 11, 12, 14, 16, 18, 19, 21, 23, 26; Oct. 19 to Nov. 3.

Monthly discharge of Rolph Creek near Taylorville, Alta., 1917.

[Drainage area, 36 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
July 11–31	10.1	5.7	7.5	0.208	0.16	312
August	14.9	7.6	10.0	.278	.32	615
September	15.8	4.2	10.8	.300	.33	643
October	4.2	2.9	3.2	.089	.10	197
November	9.7	3.0	5.6	.160	.18	333
The period	.....	.....	.....	.....	1.09	2,100

NOTE.—Discharge of this stream is believed to be above average during 1917, owing to seepage from United States Reclamation Service canal in Montana.

ROLPH CREEK NEAR KIMBALL, ALTA.

LOCATION.—In SE. ¼ sec. 21, T. 2, R. 24 W. fourth meridian.

DRAINAGE AREA.—74 square miles.

RECORDS AVAILABLE.—May 17, 1911, to October 31, 1916. Gage-height observations April 4 to July 31, 1917.

GAGE.—Vertical staff; read by J. M. Dunn.

CHANNEL.—Sand, gravel, and stone. Control likely to shift.

DISCHARGE MEASUREMENTS.—Made by wading.

ICE.—Observations discontinued during winter months.

ACCURACY.—Stage-discharge relation not permanent. Gage read to hundredths daily. Daily discharge obtained by applying daily gage height to rating table. Records poor. As the only discharge measurement made in 1917 shows that the cross section was very much enlarged in the spring of 1917, daily discharge for that year could not be computed.

Discharge measurements of Rolph Creek near Kimball, Alta., 1911–1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1911.		*Feet.*	*Sec.-ft.*	1913.		*Feet.*	*Sec.-ft.*
Apr. 29	L. J. Gleeson	.....	12.1	Aug. 8	F. R. Burfield	0.55	a 1.13
May 17	....do	2.64	58.3	27	....do	.54	a .69
17	....do	2.64	62.9	Sept. 20	L. Danielsen	.52	a .58
17	....do	2.64	65.7	Oct. 8	....do	.60	a .70
June 2	....do	2.05	13.3	Nov. 14	....do	.62	2.52
21	....do	1.75	12.7				
29	....do	1.65	18.7	1914.			
July 13	....do	1.15	2.18	Apr. 11	O. H. Hoover	1.07	15.90
21	....do	1.11	1.01	21	....do	.63	4.80
Aug. 5	....do	1.22	1.80	May 14	....do	.64	5.00
11	....do	1.31	3.72	June 3	....do	.49	.30
30	....do	1.10	1.11	23	....do	.57	a .21
Oct. 10	....do	1.45	7.26	July 16	....do	.60	a .38
17	....do	1.37	6.97	Aug. 12	....do	.60	a .13
1912.				Sept. 21	....do	.65	a .05
Apr. 19	....do	1.00	10.7	Oct. 17	....do	1.44	41.00
May 29	....do	.98	9.94	1915.			
June 4	....do	.80	4.78	Mar. 26	J. E. Degnan	1.29	27.00
18	....do	.49	.307	Apr. 20	V. A. Newhall	.62	3.97
24	....do	.48	.....	May 11	....do	.62	3.91
July 4	....do	.42	.125	June 12	....do	1.68	71.00
17	V. Meek	.84	6.16	18	....do	1.54	53.00
24	....do	.94	6.95	July 13	....do	1.15	21.00
Aug. 10	....do	.62	1.19	15	....do	1.04	17.20
24	....do	.50	.06	Aug. 4	....do	1.33	35.00
31	....do	.44	.....	19	....do	.76	5.90
Sept. 17	....do	.55	.....	Sept. 1	....do	.94	11.20
Oct. 1	....do	.74	2.04	Oct. 2	....do	1.02	15.40
Nov. 21	....do	1.25	4.66	1916.			
1913.				Apr. 6	S. H. Frame	1.30	25.0
Apr. 25	G. F. Deas	1.28	23.00	June 2	....do	1.75	93.0
30	F. R. Burfield	1.06	14.00	24	....do	1.27	31.0
May 15	....do	.96	10.40	July 27	....do	.97	6.5
June 6	....do	.76	5.24	Aug. 17	....do	1.15	16.6
12	....do	.65	4.26	Sept. 5	....do	1.57	60.0
28	....do	.98	13.50	27	....do	1.04	8.4
July 22	....do	.51	a .35				

a Weir measurement.

Daily discharge, in second-feet, of Rolph Creek near Kimball, Alta., 1911–1916.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1911.									
1	.....	.....	.....	28	a 7.1	1.50	a 1.04	a 5.4	4.1
2	.....	.....	.....	25	a 5.0	1.50	a .98	a 5.6	a 4.1
3	.....	.....	.....	24	a 3.3	1.42	a 2.00	6.0	a 3.9
4	.....	.....	.....	23	2.0	1.80	a 3.3	a 6.0	3.8
5	.....	.....	.....	a 22	2.0	2.2	a 5.0	a 5.8	a 3.6
6	.....	.....	.....	20	a 2.0	a 2.6	a 7.1	a 5.6	3.3
7	.....	.....	.....	a 20	2.0	2.9	a 9.6	5.6	a 3.3
8	.....	.....	.....	19.7	2.0	a 3.3	a 12.2	a 5.8	3.3
9	.....	.....	.....	a 19.3	a 2.0	4.3	a 15.1	6.0	a 3.0
10	.....	.....	.....	18.5	2.0	4.3	a 18.5	6.0	2.6
11	.....	.....	.....	a 17.8	2.0	a 4.1	23.0	a 5.6	a 2.6
12	.....	.....	.....	16.7	1.70	4.1	a 18.5	5.4	a 2.6
13	.....	.....	.....	a 16.7	1.50	a 3.8	a 15.1	a 5.2	2.6
14	.....	.....	.....	16.7	1.50	a 3.6	a 9.6	5.0	a 2.0
15	.....	.....	.....	a 16.7	1.42	3.3	8.1	4.8	1.50
16	.....	.....	.....	16.7	a 1.34	a 3.3	7.8	4.8	a 1.50
17	.....	.....	66	a 15.1	1.26	3.5	a 8.1	4.5	1.50
18	.....	.....	63	14.5	a 1.34	3.2	8.3	a 4.3	1.50
19	.....	.....	49	13.6	1.50	2.9	a 7.6	4.3	a 1.60
20	.....	.....	a 42	a 13.6	a 1.34	a 2.6	a 7.1	4.3	a 1.80
21	.....	.....	36	13.6	1.18	2.2	a 6.7	a 4.3	2.0
22	.....	.....	a 33	13.6	2.00	a 2.0	6.0	a 4.3	a 2.2
23	.....	.....	a 28	15.1	a 1.80	a 1.10	5.0	4.3	2.6
24	.....	.....	23	a 51	1.50	1.50	a 5.0	a 3.8	3.0
25	.....	.....	a 28	117	1.42	a 1.50	5.0	3.3	3.3
26	.....	.....	a 33	a 51	a 1.34	a 1.42	a 5.0	a 3.3	.....
27	.....	.....	42	15.1	1.26	a 1.42	a 4.8	a 3.3	.....
28	.....	.....	a 39	13.6	a 1.10	1.42	4.6	3.3	.....
29	.....	.....	a 36	10.8	.98	a 1.26	5.0	a 3.5	.....
30	.....	.....	33	a 9.6	a 1.10	1.10	5.0	a 3.6	.....
31	.....	.....	30	.....	1.50	a 1.10	.....	a 3.8	.....

a Estimated.

Daily discharge, in second-feet, of Rolph Creek near Kimball, Alta., 1911–1916—Con.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1912.									
1			12.7	8.7	0.50	5.2	0.16	3.3	4.5
2			11.7	a 7.1	.90	5.2	.16	3.3	4.5
3			11.7	a 5.7	.90	4.5	.16	3.5	a 4.3
4			11.3	4.5	.08	4.1	.16	3.5	4.3
5			11.3	3.7	.08	3.9	.20	3.5	4.1
6			11.3	3.5	.00	3.5	.16	3.5	3.7
7			10.9	3.2	5.7	2.7	.16	3.7	3.5
8			10.9	2.7	4.5	2.4	.50	3.9	3.5
9			10.9	a 2.3	4.5	2.0	.50	3.9	3.5
10			10.5	2.0	7.1	1.64	.50	4.1	a 3.7
11			10.5	2.0	8.7	1.40	.50	4.1	a 3.9
12			10.1	2.0	8.7	1.20	.66	4.3	4.1
13			9.8	2.0	8.0	1.00	.74	4.3	4.3
14			9.1	2.0	5.7	.74	.74	4.1	4.5
15			8.4	1.76	5.2	.74	.82	4.5	5.0
16			7.1	1.40	5.7	1.76	.90	4.5	
17			6.5	.90	5.7	1.40	.90	a 4.1	
18			6.5	.90	5.7	.90	.90	a 3.9	
19			6.5	.50	5.7	.74	1.40	3.7	
20			6.5	.20	6.3	.74	2.0	3.3	
21			7.1	.20	7.1	.58	a 2.0	3.7	
22			12.7	.20	8.7	.50	2.0	3.7	
23			17.3	.50	8.7	.50	2.0	3.7	
24			17.3	.50	9.1	.50	2.7	3.7	
25			15.8	.20	10.5	.44	2.7	4.1	
26			14.9	.32	10.5	.38	a 2.7	4.1	
27			14.0	.32	9.8	.32	2.7	4.1	
28			13.1	.38	8.7	.32	2.7	a 4.3	
29			14.0	.44	7.1	.26	3.0	4.3	
30			13.1	.44	6.3	a .20	a 3.2	4.5	
31			11.3		5.7	.16		4.5	
1913.									
1			11.7	9.7	20.00	2.00	.00	1.68	
2			13.3	7.8	18.20	2.20	.00	1.40	
3			14.0	7.2	18.20	2.20	.56	1.68	
4			15.1	7.2	17.60	2.20	.84	1.68	
5			13.3	7.0	14.00	2.20	.56	1.68	
6			13.3	5.2	a 12.30	2.00	.56	1.12	
7		b 58.0	13.3	4.7	10.40	1.68	a .28	.56	
8		a 57.0	13.0	4.5	9.80	1.40	.00	.56	
9		a 55.0	12.7	4.2	8.40	2.80	.00	.56	
10		a 54.0	12.0	4.4	7.00	4.20	.00	.28	
11		53.0	11.7	4.4	5.60	4.20	.00	1.68	
12		a 50.0	10.6	4.3	4.20	4.80	.00	2.80	
13		a 48.0	10.9	4.2	a 3.60	4.50	.00	3.90	
14		46.0	10.6	4.2	2.80	4.80	.00	1.96	
15		43.0	10.3	3.9	2.20	4.80	.00	6.20	
16		43.0	9.7	3.4	2.20	4.50	.28	6.70	
17		41.0	11.7	2.8	2.20	a 3.90	.28	7.30	
18		41.0	31.0	2.8	1.70	a 3.40	.56	7.60	
19		38.0	29.0	2.2	1.40	2.80	.28	7.80	
20		a 36.0	26.0	1.4	a 1.12	2.50	.56	7.80	
21		34.0	a 25.0	.8	.84	2.20	a .28	7.30	
22		30.0	24.0	1.4	.28	2.00	.00	6.70	
23		24.0	22.0	1.4	.00	2.00	1.12	6.70	
24		23.0	22.0	1.4	.00	a 1.68	1.40	c 5.60	
25		22.0	19.3	1.4	.00	1.40	1.68	5.00	
26		17.1	17.1	7.0	.00	1.14	2.20	4.50	
27		15.1	15.1	8.4	.00	1.14	2.80	4.20	
28		13.3	13.3	13.4	1.40	.84	1.96	4.20	
29		11.7	12.7	a 15.7	4.20	.56	1.68	4.20	
30		12.7	11.7	18.2	3.60	.28	1.68	4.20	
31			10.3		2.80	1.40		4.20	

a Estimated.
b No gage-height observations were made previous to this date.
c Shifting control.

Daily discharge, in second-feet, of Rolph Creek near Kimball, Alta., 1911-1916.—Con.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1914.									
1	.....	55.0	4.30	0.0	0.0	0.0	0.85	a 1.93	.....
2	.....	54.0	4.30	.10	.0	.0	.77	a 2.60	.....
3	.....	a 51.0	4.30	.30	.0	.0	.69	a 3.20	.....
4	.....	49.0	4.30	.40	.0	.25	.61	a 3.90	.....
5	.....	a 42.0	5.20	.35	.0	.23	.53	4.90	.....
6	.....	a 36.0	6.20	.30	.0	.22	.45	4.90	.....
7	.....	a 30.0	7.20	.20	.0	.21	.43	6.60	.....
8	.....	a 26.0	9.50	.0	.0	.19	.41	a 8.20	.....
9	.....	a 21.0	9.50	.0	.0	.17	.39	a 10.10	.....
10	.....	17.7	9.50	.0	a .0	.16	.37	a 12.00	.....
11	.....	16.1	9.50	.0	a .0	.14	.35	a 14.10	.....
12	.....	a 16.1	6.20	.0	a .10	.13	.33	a 16.20	.....
13	.....	a 15.7	5.60	.0	.45	.46	.31	a 19.10	.....
14	.....	15.7	5.10	.0	.43	.79	.29	22.00	.....
15	.....	a 13.2	4.70	.0	.40	1.12	.27	a 21.00	.....
16	.....	a 11.3	4.10	.0	.38	1.45	.25	21.00	.....
17	.....	9.5	4.00	.0	.36	1.80	.21	19.10	.....
18	.....	a 8.3	3.90	.0	.34	1.60	.17	19.10	.....
19	.....	a 7.2	3.80	.0	.32	1.40	.13	18.50	.....
20	.....	a 6.2	3.70	.0	.30	1.20	a .09	17.40	.....
21	.....	5.2	3.00	a .0	.0	1.00	.05	16.20	.....
22	.....	a 5.1	2.60	a .0	.0	.80	.05	16.20	.....
23	.....	a 4.9	2.50	.21	.0	.76	.05	15.40	.....
24	.....	4.7	2.00	a .0	.0	.72	.05	14.10	.....
25	.....	a 4.7	1.90	a .0	.0	.68	.05	12.00	.....
26	.....	a 4.5	1.20	.0	.0	.64	.05	12.00	.....
27	.....	a 4.5	.75	.0	.0	.60	.05	8.20	.....
28	.....	4.3	.45	.0	.0	.65	.05	6.60	.....
29	.....	4.7	.10	.0	.0	.70	a .67	4.90	.....
30	.....	4.3	.....	.0	.0	.75	a 1.29	3.20	.....
31	.....	.....	.....	.....	.0	.80	.....	1.60	.....
1915.									
1	.....	19.0	4.4	2.2	125.0	a 53.0	11.6	14.0	.....
2	.....	22.0	a 4.6	2.1	99.0	49.0	a 20.0	14.8	.....
3	.....	24.0	4.7	3.0	73.0	44.0	a 32.0	a 15.6	.....
4	.....	21.0	5.2	125.0	58.0	33.0	49.0	16.0	.....
5	.....	18.5	6.7	125.0	49.0	29.0	49.0	16.0	.....
6	.....	18.5	6.5	118.0	44.0	27.0	54.0	17.2	.....
7	.....	16.0	6.3	112.0	44.0	24.0	49.0	24.0	.....
8	.....	16.0	5.9	95.0	44.0	a 21.0	37.0	26.0	.....
9	.....	14.0	4.9	66.0	44.0	18.5	29.0	24.0	.....
10	.....	14.0	4.4	63.0	44.0	14.0	24.0	a 23.0	.....
11	.....	12.8	3.9	66.0	37.0	12.0	21.0	22.0	.....
12	.....	12.0	3.9	70.0	28.0	10.2	a 21.0	a 22.0	.....
13	.....	10.2	4.1	70.0	21.0	9.5	21.0	22.0	.....
14	.....	8.5	7.4	66.0	21.0	7.4	21.0	a 22.0	.....
15	.....	7.0	49.0	64.0	15.6	a 7.0	19.5	21.0	.....
16	.....	6.3	39.0	60.0	22.0	6.7	18.5	a 17.2	.....
17	.....	5.6	34.0	57.0	22.0	a 6.7	18.5	14.0	.....
18	.....	a 5.2	31.0	53.0	27.0	a 6.5	18.5	14.0	.....
19	.....	4.9	24.0	73.0	34.0	6.5	a 17.2	a 13.2	.....
20	.....	3.9	18.0	a 66.0	34.0	70.0	16.8	12.8	.....
21	.....	3.6	16.0	60.0	34.0	74.0	16.0	a 12.8	.....
22	80.0	3.6	14.0	49.0	34.0	a 70.0	16.0	12.8	.....
23	73.0	3.4	13.2	39.0	33.0	66.0	14.0	12.8	.....
24	49.0	3.1	12.0	34.0	28.0	60.0	21.0	12.0	.....
25	39.0	a 3.1	11.3	39.0	24.0	a 54.0	18.5	a 12.0	.....
26	29.0	3.0	9.4	210.0	21.0	49.0	a 17.2	12.0	.....
27	27.0	3.6	7.4	190.0	18.5	44.0	16.0	12.0	.....
28	a 27.0	3.1	5.2	177.0	18.5	a 37.0	16.0	12.0	.....
29	27.0	2.4	3.6	161.0	39.0	31.0	16.0	a 12.0	.....
20	21.0	2.4	2.2	144.0	44.0	a 21.0	16.0	12.0	.....
31	19.5	.....	2.1	.....	58.0	14.0	.....	a 12.0	.....

a Estimated.

Daily discharge, in second-feet, of Rolph Creek near Kimball, Alta., 1911–1916.—Con.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1916.									
1	.....	38.0	14.9	93	116.0	6.6	14.3	7.0	.....
2	.....	a 35.0	18.5	93	82.0	6.6	14.9	7.0	.....
3	.....	32.0	20.0	93	64.0	6.6	a 21.0	7.0	.....
4	.....	a 30.0	18.5	a 79	50.0	6.6	27.0	6.0	.....
5	.....	29.0	17.1	64	38.0	6.6	60.0	7.0	.....
6	.....	27.0	14.9	150	27.0	a 6.6	32.0	9.6	.....
7	.....	a 27.0	a 13.5	93	22.0	6.6	27.0	7.6	.....
8	.....	27.0	12.1	64	18.5	6.6	22.0	a 9.8	.....
9	.....	a 26.0	12.1	58	14.9	14.9	18.5	12.1	.....
10	.....	25.0	11.1	50	14.9	27.0	a 18.5	13.2	.....
11	.....	a 22.0	9.6	a 49	12.1	22.0	18.5	14.9	.....
12	.....	18.5	9.6	48	11.1	21.0	18.5	13.8	.....
13	.....	17.0	9.6	46	9.6	20.0	17.1	a 13.5	.....
14	.....	15.6	a 9.6	44	8.8	18.5	15.6	13.2	.....
15	.....	14.9	9.6	38	6.6	17.1	14.9	a 13.2	.....
16	.....	a 14.9	9.6	27	a 6.6	17.1	14.9	13.2	.....
17	.....	14.9	9.6	22	6.6	14.9	a 14.0	12.7	.....
18	.....	a 14.9	9.6	22	6.3	18.5	13.2	12.7	.....
19	.....	a 14.9	9.6	a 22	6.3	17.1	12.1	a 12.4	.....
20	.....	14.9	9.6	22	6.3	15.6	12.1	12.1	.....
21	.....	14.9	9.6	24	6.0	14.9	12.1	12.1	.....
22	.....	14.9	11.1	32	5.8	14.3	12.1	12.1	.....
23	.....	14.9	12.1	27	a 5.8	13.2	12.1	12.1	.....
24	.....	14.9	18.5	24	5.8	12.1	a 12.1	12.1	.....
25	.....	13.2	a 75.0	24	5.8	12.1	12.1	13.2	.....
26	.....	12.1	93.0	25	6.0	12.1	12.1	13.2	.....
27	.....	12.1	93.0	27	6.6	12.1	9.2	13.2	.....
28	.....	12.1	82.0	116	6.6	12.1	7.6	12.7	.....
29	.....	13.2	79.0	93	6.6	12.1	7.0	a 12.4	.....
30	.....	13.2	127.0	161	6.6	12.1	7.0	12.1	.....
31	.....	.....	116.0	.....	6.6	12.1	.....	12.1	.....

a Estimated.

NOTE.—1914: Shifting control May 15 to Sept. 21. No flow May 30 t June 1, June 8-22, June 24 to July 11, and July 21 to Aug. 3.

Monthly discharge of Rolph Creek near Kimball, Alta., 1911–1916.

[Drainage area, 74 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1911.						
May 17–31	66.	0.23	38.7	0.523	0.29	1,151
June	117.	9.6	22.9	.310	.35	1,363
July	7.1	.98	1.92	.026	.03	118
August	4.3	1.10	2.46	.033	.04	151
September	23.	.98	8.00	.108	.12	476
October	6.0	3.3	4.74	.064	.07	291
November 1–25	4.1	1.50	2.69	.036	.03	133
The period					.93	3,683
1912.						
May	17.3	6.5	11.1	.150	.17	682
June	8.7	.20	1.99	.027	.03	118
July	10.5	.00	5.96	.081	.09	366
August	5.2	.16	1.61	.022	.02	99
September	3.2	.16	1.26	.017	.02	75
October	4.5	3.3	3.92	.053	.06	241
November 1–15	5.0	3.5	4.09	.055	.03	121
The period					.42	1,702
1913.						
April 7–30	58.0	11.70	36.10	.488	.436	1,718
May	31.0	9.70	15.70	.212	.244	965
June	18.2	.80	5.49	.074	.083	326
July	20.0	.00	5.68	.076	.088	349
August	4.8	.28	2.53	.034	.039	156
September	2.8	.00	.65	.009	.010	39
October	7.8	.28	3.90	.053	.060	240
The period					.960	3,793
1914.						
April	55.00	4.30	18.30	.247	.280	1,089
May	9.50	.00	4.20	.057	.060	258
June	.40	.00	.06	.001	.001	4
July	.45	.00	.10	.001	.001	6
August	1.80	.00	.73	.010	.010	45
September	1.29	.05	.34	.005	.006	20
October	22.00	1.60	11.50	.155	.018	707
The period					.376	2,129
1915.						
March 22–31	80.	19.5	39.2	.530	.197	777
April	24.	2.4	9.7	.131	.146	577
May	49.	2.1	11.8	.160	.184	726
June	210.	2.1	82.0	1.108	1.236	4,879
July	125.	15.6	39.9	.540	.623	2,453
August	74.	6.5	31.4	.424	.489	1,931
September	54.	11.6	23.8	.321	.358	1,416
October	26.	12.0	16.3	.220	.254	1,002
The period					3.487	13,761
1916.						
April	38.0	12.1	19.8	.268	.30	1,178
May	127.0	9.6	31.0	.419	.48	1,906
June	150.0	22.0	58.0	.784	.87	3,451
July	116.0	5.8	19.2	.259	.30	1,181
August	27.0	6.6	13.4	.181	.21	824
September	60.0	7.0	17.0	.230	.26	1,012
October	14.9	6.0	11.5	.155	.18	707
The period					2.60	10,259

Mean monthly discharge, in second-feet, of Rolph Creek near Kimball, Alta., 1911–1917.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total in acre-feet.
1911	.....	.....	[a] 39.0	23.00	1.92	2.50	8.00	4.70	[b] 3.00	[a] 3,729
1912	.....	.....	11.1	1.99	6.00	1.61	1.26	3.90	[b] 4.00	[a] 1,819
1913	.....	[b] 36.0	15.7	5.50	5.70	2.50	.65	3.90	.....	3,793
1914	.....	18.0	4.2	.06	0.10	.73	.34	11.50	.....	2,129
1915	[a] 39.0	9.7	11.8	82.00	40.00	31.00	24.00	16.30	.....	13,761
1916	.....	19.8	31.0	58.00	19.20	13.40	17.00	11.50	.....	10,259
Average	.....	21	14.8	28	12.2	8.6	8.5	8.6	3.5	7,486
Average run-off, acre-feet	.....	1,250	910	1,666	750	529	506	529	208	6,348
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	86

[a] Incomplete record not included in average.
[b] Average for part of month assumed as monthly average.

NOTE.—Records for 1917 were taken near Taylorville and include seepage from United States Reclamation Service St. Mary canal in Montana. They are not included in this historic summary, which shows only natural flow.

LEE CREEK AT LAYTON'S RANCH, ALTA.

LOCATION.—In SE. ¼ sec. 27, T. 2, R. 26 W., fourth meridian, at B. Layton's ranch, about 6 miles southwest of the town of Cardston, Alta.

DRAINAGE AREA.—92 square miles.

RECORDS AVAILABLE.—May 25, 1913, to December 31, 1917.

GAGE.—Chain gage on left bank; read by B. Layton.

DISCHARGE MEASUREMENTS.—Made from cable or by wading. The wading section is about 2,400 feet and the cable section about 2,800 feet upstream from the gage.

CHANNEL AND CONTROL.—Bed and control composed of gravel; not likely to shift. Right bank subject to overflow; left bank high and not subject to overflow.

EXTREMES OF DISCHARGE.—1913–1917: Maximum stage recorded. 4.10 feet June 29, 1916 (discharge, 913 second-feet); minimum stage recorded, 3.10 feet February 21, 1914 (discharge, 5.2 second-feet).

ICE.—Stage-discharge relation affected by ice during winter.

DIVERSION.—The town of Cardston diverts water for domestic supply half a mile below the gage.

ACCURACY.—Stage-discharge relation fairly permanent during open-water periods. Gage read to hundredths daily. Daily discharge for open-water periods obtained by applying daily gage height to rating table; winter discharge obtained from hydrograph based on discharge measurements, records of maximum and minimum temperature, and daily gage height graphs. Open-water records good except for extremely high stages; winter and flood-stage records only fair.

Discharge measurements of Lee Creek at Layton's ranch, Alta., 1913–1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1913.		*Feet.*	*Sec.-ft.*	1915.		*Feet.*	*Sec.-ft.*
June 17	F. R. Burfield	2.16	108.0	July 6	V. A. Newhall	2.200	208.0
July 7	do	2.14	87.0	28	do	2.390	277.0
18	do	1.94	48.0	Aug. 21	do	2.160	190.0
Aug. 6	do	1.82	32.0	Sept. 3	W. A. Burton	2.500	284.0
25	do	1.73	24.0	Oct. 19	V. A. Newhall	1.950	137.0
Sept. 12	do	1.62	17.2	Nov. 15	W. H. Storey	1.750	70.0
26	L. Danielsen	1.72	23.0	19	do	1.710	67.0
Oct. 18	do	1.89	33.0	29	do	1.660	56.0
Nov. 4	do	1.88	40.0	Dec. 10	do	1.360	29.0
1914.				29	do	1.980	21.0
Jan. 3	J. E. Degnan	2.60	7.2	1916.			
14	do	2.44	24.0	Jan. 15	do	[b] 2.47	19.0
27	do	3.03	10.2	22	V. A. Newhall	2.17	21.0
Feb. 7	do	2.37	6.9	Feb. 5	do	3.32	14.8
28	do	3.90	8.2	Mar. 4	do	[b] 3.01	24.0
Mar. 7	do	3.60	16.5	31	S. H. Frame	1.70	94.0
30	O. H. Hoover	2.88	26.0	Apr. 21	do	1.84	123.0
Apr. 17	do	2.17	92.0	May 12	do	1.93	165.0
May 9	do	2.43	195.0	July 7	do	2.30	265.0
12	do	2.31	139.0	22	W. A. Burton	1.63	90.0
25	do	2.30	125.0	Aug. 23	S. H. Frame	1.20	42.0
June 19	do	2.13	75.0	Sept. 11	do	1.18	36.0
July 8	do	1.95	43.0	19	W. A. Burton	1.06	27.0
25	do	1.70	18.3	Oct. 14	S. H. Frame	1.25	44.0
Aug. 8	do	1.58	9.9	Nov. 22	do	[b] 1.25	49.0
26	do	1.79	24.0	29	H. W. Rowley	[b] 1.12	22.0
Sept. 10	do	1.62	11.8	Dec. 18	do	[b] 1.54	25.0
29	do	1.63	11.8	1917.			
Oct. 20	do	2.27	114.0	Jan. 12	do	1.42	15.7
Nov. 21	do	2.24	56.0	Feb. 2	W. A. Burton	1.47	15.2
30	do	1.67	13.3	17	G. S. Wenden	1.25	19.2
Dec. 23	do	2.31	19.9	Mar. 12	do	1.28	13.9
1915.				31	A. W. Lowrie	2.38	32.0
Jan. 4	do	2.540	23.0	June 5	do	[a] 2.26	356.0
15	do	2.460	17.4	30	do	1.78	152.0
Feb. 1	W. A. Burton	2.700	13.6	July 25	do	1.29	35.0
16	J. E. Degnan	3.005	13.3	Aug. 6	do	1.20	23.0
Mar. 8	do	2.145	9.6	29	do	1.09	13.0
22	do	2.150	57.0	Oct. 19	do	1.15	18.1
Apr. 7	V. A. Newhall	2.070	63.0	Nov. 12	S. H. Frame	1.16	15.5
May 19	do	2.640	246.0	Dec. 2	D. G. Chadsey	1.13	4.8
June 26	do	[a] 2.705	353.0	31	S. H. Frame	1.66	51.0

[a] New gage. [b] Ice present.

Daily discharge, in second-feet, of Lee Creek at Layton's ranch, Alta., 1913–1917.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1913.												
1						196	149	44	25.0	16.5	29	[a] 20.0
2						191	135	39	26.0	16.5	30	18.0
3						188	121	36	25.0	16.2	33	[a] 16.0
4						182	118	33	23.0	16.2	39	14.0
5						174	110	31	22.0	17.5	34	12.0
6					112	166	101	32	21.0	19.6	36	10.0
7					115	157	69	28	20.0	22.0	[a] 37	[a] 9.0
8					121	152	82	36	19.6	23.0	38	8.4
9					124	149	76	46	19.0	26.0	[a] 38	[a] 8.4
10					124	140	74	58	19.0	30.0	39	8.4
11					129	135	74	52	18.5	34.0	42	9.0
12					135	126	72	50	17.5	42.0	44	9.0
13					140	121	72	55	17.5	67.0	42	[a] 9.0
14					143	115	69	50	16.5	55.0	42	9.0
15					149	112	67	46	16.2	48.0	42	10.0
16					152	107	60	45	15.9	42.0	42	[a] 10.0
17					157	101	54	44	15.9	37.0	41	10.0
18					160	93	50	39	15.6	41.0	39	10.6
19					166	87	46	36	16.5	[a] 36.0	[a] 31	[a] 10.0
20					169	104	44	[a] 33	17.5	30.0	30	10.0
21					171	96	41	31	19.6	[a] 30.0	32	[a] 10.0
22					174	87	38	29	30.0	29.0	[a] 32	9.0
23					177	74	39	27	25.0	[a] 29.0	31	[a] 9.0
24					182	79	37	26	23.0	28.0	[a] 31	9.0
25					188	199	37	24	21.0	28.0	30	[a] 9.0
26					196	303	69	23	21.0	28.0	[a] 29	[a] 9.0
27					205	292	58	23	18.5	28.0	28	9.0
28					210	272	52	22	18.0	29.0	48	[a] 8.0
29					208	292	64	22	17.0	30.0	[a] 34	8.0
30					205	177	52	24	16.5	30.0	25	8.0
31					199		46	25		29.0		8.0

[a] Estimated.

Daily discharge, in second-feet, of Lee Creek at Layton's ranch, Alta., 1913–1917—Contd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1914.												
1	7.2	11.6	9.5	31	76	122	61.0	12.2	a12.8	12.8	54.0	13.8
2	7.2	11.9	11.2	a34	92	118	54.0	12.2	12.8	12.8	58.0	14.0
3	7.2	11.6	a12.6	38	122	118	47.0	11.6	12.2	13.4	60.0	14.0
4	9.0	10.0	13.9	41	149	115	44.0	11.6	12.2	14.6	61.0	13.3
5	12.2	8.0	a15.0	a44	165	104	47.0	11.0	14.6	17.0	61.0	a13.2
6	18.0	6.6	16.0	47	154	98	a46.0	11.0	16.4	20.0	63.0	13.5
7	20.0	6.9	16.5	49	144	94	a44.0	11.0	17.8	23.0	65.0	14.0
8	21.0	8.0	16.9	a47	134	89	43.0	11.0	17.0	27.0	65.0	14.1
9	21.0	10.6	a16.8	44	154	84	a44.0	12.8	17.0	34.0	69.0	14.1
10	21.0	11.8	16.8	52	a144	79	a46.0	13.4	15.8	39.0	69.0	14.0
11	21.0	11.3	a17.2	67	134	79	46.0	14.0	15.8	43.0	74.0	14.3
12	21.0	11.1	18.6	a56	129	79	44.0	12.8	23.0	46.0	79.0	15.2
13	23.0	12.0	a21.0	46	139	a76	43.0	11.0	22.0	49.0	89.0	a15.9
14	24.0	13.2	a23.0	54	134	76	42.0	10.0	21.0	92.0	94.0	16.0
15	24.0	13.9	24.0	112	126	74	40.0	9.0	25.0	126.0	90.0	16.0
16	24.0	13.8	a25.0	a108	118	74	39.0	8.5	23.0	178.0	a86.0	16.7
17	22.0	12.7	25.0	101	a115	a74	36.0	61.0	22.0	158.0	80.0	17.8
18	19.5	10.2	26.0	79	112	76	35.0	43.0	21.0	139.0	74.0	17.2
19	16.5	7.2	26.0	101	112	76	33.0	36.0	20.0	129.0	67.0	16.8
20	14.3	5.6	a26.0	154	115	76	30.0	30.0	18.6	118.0	62.0	a18.0
21	13.9	5.2	25.0	163	115	79	27.0	23.0	17.0	94.0	56.0	19.1
22	13.8	5.5	25.0	a149	118	82	24.0	18.6	15.8	72.0	51.0	19.8
23	13.6	5.7	a25.0	139	122	82	22.0	54.0	14.6	67.0	44.0	19.9
24	13.0	6.0	24.0	122	a126	112	20.0	47.0	14.6	65.0	38.0	19.7
25	12.1	6.4	23.0	a115	129	129	17.0	36.0	14.0	63.0	32.0	a18.3
26	11.2	6.9	a23.0	a108	134	149	15.8	22.0	14.0	61.0	35.0	17.5
27	10.2	7.3	23.0	104	129	129	14.6	17.0	13.4	60.0	43.0	18.0
28	9.1	8.2	a24.0	94	126	112	14.0	14.6	13.4	58.0	39.0	18.6
29	8.6	.....	a25.0	86	122	82	13.4	13.4	12 8	58 0	21 0	19 4
30	9.2	.....	26.0	79	122	72	12.8	12.2	12.8	56.0	13.3	19.7
31	10.3	.....	28.0	.....	a122	.....	12.8	a12.2	.....	54.0	.....	20.0
1915.												
1	21.0	13.6	11.6	45	179	103	234	210	26	60	49	62
2	22.0	14.0	10.6	52	346	179	234	204	41	69	45	58
3	23.0	14.2	9.9	55	340	444	222	192	336	83	45	56
4	23.0	14.5	9.4	57	323	a427	213	174	129	104	44	56
5	23.0	14.8	9.3	63	253	a410	204	153	64	101	44	56
6	23.0	14.8	9.3	64	117	a392	213	123	52	107	42	60
7	22.0	14.8	9.4	63	109	413	198	115	45	104	42	60
8	21.0	14.4	9.6	59	103	343	174	101	37	104	42	62
9	20.0	14.1	9.8	47	98	320	144	88	76	93	45	a36
10	19.4	13.8	10.0	52	93	543	129	78	101	93	45	27
11	18.6	13.0	a10.3	54	93	458	115	66	83	104	45	28
12	18.1	12.8	10.6	57	90	442	101	70	69	93	45	28
13	17.8	a12.6	11.0	57	142	416	115	76	76	109	50	29
14	17.6	12.8	11.3	76	174	499	101	62	64	109	54	30
15	17.4	13.0	11.8	78	311	560	88	62	60	112	76	31
16	17.3	13.4	12.3	72	289	429	78	54	60	115	62	29
17	17.0	13.8	13.0	74	253	426	71	50	58	115	64	28
18	a16.8	14.1	14.1	72	219	475	180	41	52	121	69	27
19	16.2	14.2	a16.2	68	253	465	171	38	83	123	66	a27
20	15.5	14.0	19.9	63	166	362	132	330	76	126	69	27
21	14.7	12.5	26.0	61	155	282	88	144	64	115	69	26
22	14.1	11.8	78.0	59	148	234	78	76	60	98	69	27
23	13.8	11.9	90.0	55	142	219	60	64	56	83	71	26
24	a13.3	13.0	90.0	55	142	204	56	54	52	76	71	27
25	13.2	14.1	76.0	54	135	260	74	37	60	71	74	26
26	13.0	14.5	29.0	54	129	365	83	36	58	64	62	25
27	13.0	14.3	31.0	52	129	346	189	31	56	60	58	24
28	13.1	a13.5	34.0	50	126	288	260	30	50	56	a56	22
29	13.1	.....	40.0	90	123	225	234	29	47	54	56	21
30	13.2	.....	40.0	117	123	240	a225	28	45	52	a60	20
31	a13.2	.....	42.0	.....	117	.....	a216	27	.....	a50	.....	19

a Estimated.

Daily discharge, in second-feet, of Lee Creek at Layton's ranch, Alta., 1913–1917—Contd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1916.												
1	18.4	8.6	21	114	141	470	a607	45	37	24	37	21.0
2	18.5	9.3	22	111	202	438	373	42	41	24	37	21.0
3	19.0	10.8	23	104	209	427	366	41	43	27	39	21.0
4	19.5	12.8	24	100	215	427	359	40	41	29	39	22.0
5	20.0	14.8	27	97	229	409	344	39	40	29	37	23.0
6	21.0	16.2	32	104	236	409	330	38	39	29	34	24.0
7	21.0	17.2	40	116	319	427	265	37	39	29	29	25.0
8	20.0	18.4	49	114	265	459	276	48	39	35	27	26.0
9	18.3	19.7	61	a114	247	481	240	113	38	37	27	26.0
10	16.2	21.0	70	114	180	571	212	97	38	37	27	27.0
11	15.3	23.0	81	122	158	a326	180	87	37	37	28	28.0
12	15.4	26.0	92	129	148	481	166	74	37	36	30	28.0
13	16.2	29.0	107	141	148	445	158	65	37	35	34	28.0
14	17.8	44.0	116	158	a150	416	146	58	37	43	37	28.0
15	19.0	126.0	126	183	151	402	136	50	36	41	40	28.0
16	21.0	218.0	135	a174	153	391	129	47	35	39	42	27.0
17	22.0	300.0	148	166	141	409	122	46	33	39	45	26.0
18	23.0	245.0	157	151	134	427	118	44	32	39	47	25.0
19	23.0	190.0	161	141	127	420	111	43	28	39	48	24.0
20	23.0	132.0	161	134	136	409	104	42	29	38	49	23.0
21	22.0	75.0	161	127	141	391	100	41	29	38	49	23.0
22	21.0	38.0	146	127	156	373	89	41	29	37	49	22.0
23	19.7	31.0	134	129	177	355	87	39	27	37	46	21.0
24	17.7	27.0	122	136	337	308	81	38	26	37	41	21.0
25	15.6	25.0	104	151	373	409	70	37	26	37	35	20.0
26	13.8	23.0	104	141	420	481	73	37	25	37	29	19.5
27	12.2	22.0	102	134	427	647	68	36	24	37	25	19.5
28	10.8	22.0	100	125	481	783	64	36	24	36	23	20.0
29	9.5	21.0	100	127	524	913	56	35	21	36	22	21.0
30	8.8	.....	a100	129	510	841	50	34	21	35	21	21.0
31	8.5	.....	100	.....	517	.....	47	34	.....	35	.....	21.0
1917.												
1	a22.0	14.0	12.0	34	44	475	148	24.0	13.4	14.0	14.0	5.0
2	22.0	15.2	12.0	34	49	458	141	23.0	16.7	15.0	15.0	4.5
3	22.0	16.0	12.0	35	52	393	138	23.0	16.7	14.0	16.0	4.0
4	22.0	16.5	12.0	36	52	352	135	22.0	18.5	14.0	17.0	4.0
5	21.0	17.5	12.0	38	62	337	131	23.0	16.7	13.0	17.0	4.0
6	20.0	18.0	12.0	39	49	322	125	23.0	14.9	13.0	18.0	4.5
7	20.0	19.0	12.0	40	56	313	119	26.0	14.0	12.5	17.0	5.0
8	20.0	20.0	12.0	41	68	372	113	23.0	13.4	12.5	16.0	5.5
9	19.0	21.0	12.5	43	84	425	110	22.0	14.0	13.0	16.0	6.0
10	18.0	22.0	13.5	44	96	452	105	22.0	14.0	13.0	15.0	7.0
11	17.0	21.0	13.5	45	110	480	99	21.0	14.9	14.0	16.0	8.0
12	15.7	21.0	13.9	47	125	510	96	21.0	14.9	14.0	16.0	9.0
13	15.7	21.0	14.0	49	236	480	89	20.0	14.0	14.0	17.0	11.0
14	15.0	20.0	14.0	52	486	469	86	19.4	13.4	16.0	17.0	12.0
15	14.0	20.0	14.0	a57	545	425	70	19.4	13.4	17.0	18.0	13.0
16	14.0	19.5	14.0	62	486	399	66	18.5	14.0	17.0	19.4	11.0
17	14.0	19.2	14.5	72	441	387	58	18.5	14.0	17.0	22.0	9.0
18	14.0	18.0	14.5	74	393	387	56	18.5	14.9	18.0	22.0	7.0
19	14.0	17.0	15.0	79	352	347	54	17.6	14.9	18.0	19.4	7.0
20	14.0	16.0	16.0	84	304	332	52	16.7	14.9	18.0	19.4	7.0
21	14.0	15.0	17.0	72	352	313	50	16.7	14.0	18.0	18.0	7.0
22	14.0	14.0	18.0	77	377	276	46	15.8	14.0	17.0	17.0	8.0
23	14.0	14.0	19.0	84	388	240	41	15.8	13.4	18.0	17.0	9.0
24	14.0	13.5	20.0	84	419	232	35	14.9	14.9	18.0	16.0	12.0
25	14.0	13.0	22.0	89	441	211	35	14.0	14.9	17.0	16.0	14.0
26	13.5	12.5	23.0	89	607	211	33	14.0	14.9	17.0	15.0	18.0
27	13.0	12.5	25.0	86	672	191	31	14.0	14.0	16.0	13.0	20.0
28	12.5	12.0	26.0	72	516	180	28	14.0	14.0	16.0	11.0	25.0
29	12.0	.....	28.0	52	510	173	27	13.4	13.4	18.0	9.0	31.0
30	12.0	.....	30.0	41	486	162	24	13.4	13.4	12.5	7.0	40.0
31	a13.0	.....	32.0	.....	486	.....	23	a13.4	.....	a13.0	.....	51.0

a Estimated.

NOTE.—1913: Stage-dsicharge relation affected by ice Nov. 28 to Dec. 31.
1914: Stage-discharge relation affected by ice Jan. 1 to Apr. 6 and Nov. 14 to Dec. 31.
1915: Stage-discharge relation affected by ice Jan. 1 to Mar. 21 and Dec. 15–31. New gage put in June 6.
1916: Stage-discharge relation affected by ice Jan. 1 to Mar. 20 and Nov. 6 to Dec. 31.
1917: Stage-discharge relation affected by ice Jan. 1 to Apr. 13 and Nov. 27 to Dec. 31. Shifting control Nov. 15.

Monthly discharge of Lee Creek at Layton's ranch, Alta., 1913–1917.

[Drainage area, 92 square miles].

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1913						
May 6-31	210	112.0	162.0	1.760	1.700	8,355
June	303	74.0	153.0	1.660	1.850	9,104
July	149	37.0	71.9	.782	0.902	4,421
August	58	22.0	35.8	.389	.448	2,201
September	30	15.6	19.9	.216	.241	1,184
October	67	16.2	30.8	.335	.386	1,894
November	48	25.0	35.6	.387	.432	2,118
December	20	8.0	10.2	0.111	0.128	627
The period					6.087	29,904
1914.						
January	24.0	7.2	15.4	.167	.19	947
February	13.9	5.2	9.2	.100	.10	511
March	26.0	9.5	21.0	.228	.26	1,291
April	163.0	31.0	82.0	.891	.99	4,879
May	163.0	76.0	127.0	1.380	1.59	7,809
June	149.0	72.0	94.0	1.020	1.14	5,593
July	61.0	12.8	34.0	.370	.43	2,091
August	61.0	8.5	20.0	.217	.25	1,230
September	25.0	12.2	16.7	.182	.20	994
October	178.0	12.8	65.0	.707	.82	3,997
November	94.0	13.3	60.0	.652	.73	3,570
December	20.0	13.2	16.5	.179	.21	1,014
The year					6.91	33,926
1915.						
January	23.0	13.0	17.3	.188	.217	1,064
February	14.8	11.8	13.7	.149	.155	761
March	90.0	9.3	26.0	.282	.325	1,599
April	117.0	45.0	62.5	.680	.759	3,719
May	346.0	90.0	174.8	1.900	2.190	10,748
June	560.0	103.0	359.0	3.902	4.353	21,362
July	260.0	56.0	151.0	1.641	1.892	9,285
August	330.0	27.0	91.7	1.000	1.153	5,638
September	336.0	26.0	71.2	.774	.864	4,237
October	126.0	50.0	91.1	.990	1.141	5,602
November	76.0	42.0	56.3	.612	.683	3,350
December	62.0	19.0	35.0	.380	.440	2,152
The year					14.172	69,517
1916.						
January	23	8.5	17.6	.191	.22	1,082
February	300	8.6	61.0	.663	.72	3,509
March	161	21.0	94.0	1.020	1.18	5,780
April	183	97.0	130.0	1.410	1.57	7,736
May	524	127.0	250.0	2.720	3.14	15,372
June	913	308.0	478.0	5.200	5.80	28,443
July	607	47.0	178.0	1.930	2.22	10,945
August	113	34.0	49.0	.533	.61	3,013
September	43	21.0	33.0	.359	.40	1,964
October	43	24.0	35.0	.380	.44	2,152
November	49	21.0	36.0	.391	.44	2,142
December	28	19.5	24.0	.261	.30	1,476
The year					17.04	83,614
1917.						
January	22.0	12.0	16.1	.175	.20	990
February	22.0	12.0	17.1	.186	.19	950
March	32.0	12.0	17.0	.185	.21	1,045
April	89.0	34.0	58.0	.630	.70	3,451
May	672.0	44.0	301.0	3.270	3.77	18,508
June	510.0	162.0	343.0	3.730	4.16	20,410
July	148.0	23.0	76.0	.826	.96	4,673
August	26.0	13.4	18.7	.203	.23	1,150
September	18.5	13.4	14.6	.159	.18	869
October	18.0	12.5	15.4	.167	19	947
November	22.0	7.0	16.2	.176	.20	964
December	51.0	4.0	12.2	.133	.15	750
The year					11.14	54,707

Mean monthly discharge, in second-feet, of Lee Creek at Layton's ranch, Alta., 1913–1917.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total acre-ft.
1913	.....	.....	.....	.....	[a]162	153	72	36.0	19.9	31.0	36.0	10.2	[a]29,900
1914	15.4	9.2	21.0	82	127	94	34	20.0	16.7	65.0	60.0	16.5	33,926
1915	17.3	13.7	26.0	62	175	359	151	92.0	71.0	91.0	56.0	35.0	69,517
1916	17.6	61.0	94.0	130	250	478	178	49.0	33.0	35.0	35.0	24.0	83,614
1917	16.1	17.1	17.0	58	301	343	76	18.7	14.6	15.4	16.2	12.2	54,707
Average	16.6	25	40	83	213	285	102	43	31	45	41	19.8	60,441
Average run-off, acre-feet	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	620
Average run-off per square mile	1,021	1,433	2,460	4,939	13,097	16,959	6,272	2,644	1,845	2,767	2,440	1,218	57,095

[a] Incomplete record not included in average.

LEE CREEK AT CARDSTON, ALTA.

LOCATION.—In NW. ¼ sec. 10, T. 3, R. 25 W., fourth meridian, on the eastern outskirts of the town of Cardston.

DRAINAGE AREA.—118 square miles.

RECORDS AVAILABLE.—Open-water periods June 28, 1909, to July 13, 1914, when station was abandoned.

GAGE.—Vertical staff fastened to pile of footbridge 4 feet from left bank; read by Ora S. Williams.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed of stream gravel and sand. Right bank high and not subject to overflow; left bank low and subject to overflow. One channel at low stages, two channels at high stages. Control not permanent.

EXTREMES OF DISCHARGE.—1909–1914: Maximum stage recorded, 4 feet May 15, 1911 (discharge, 1,400 second-feet); minimum stage recorded, 1.10 feet August 6, 1910 (discharge, 2 second-feet).

ICE.—Stage-discharge relation affected by ice during winter.

ACCURACY.—Stage-discharge relation not permanent 1909 to 1912; discharge curves poorly defined; permanent 1913 and 1914, and curves well defined. Records fair.

Discharge measurements of Lee Creek at Cardston, Alta., 1908–1914.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1908.		*Feet.*	*Sec.-ft.*	1910.		*Feet.*	*Sec.-ft.*
June 24	H. C. Ritchie	.....	216.0	Aug. 9	F. H. Peters	1.25	5.95
July 1	H. R. Carscallen	.....	149.0	Sept. 5	N. M. Sutherland	1.68	50.8
Sept. 2	H. C. Ritchie	.....	13.5	20	.....do	1.59	43.6
15	H. R. Carscallen	.....	11.4	Oct. 7	.....do	1.62	58.9
1909.				8	.....do	1.64	63.0
June 2	H. C. Ritchie	.....	518.5	24	.....do	1.75	34.0
28	.....do	2.35	213.3	Nov. 10	.....do	1.45	33.9
July 20	.....do	1.85	62.6	Dec. 20	W. H. Greene	2.15	18.82
Aug. 11	.....do	1.75	64.7	1911.			
25	.....do	1.55	30.8	Apr. 4	J. E. Degnan	1.67	27.0
25	.....do	1.55	28.7	8	L. J. Gleeson	1.76	121.7
Sept. 11	.....do	1.56	34.4	22	.....do	2.47	207.5
28	A. W. Pae	1.46	18.4	28	.....do	1.98	144.6
Oct. 29	.....do	1.45	15.9	May 22	.....do	2.08	286.5
1910.				31	.....do	2.16	310.2
Apr. 11	L. J. Gleeson	1.7	52.3	June 10	.....do	1.98	199.0
23	.....do	1.65	32.8	12	.....do	1.96	185.8
May 7	.....do	1.65	32.2	17	.....do	1.84	153.7
21	.....do	2.03	121.8	July 3	.....do	1.83	163.5
June 4	.....do	1.72	54.1	10	.....do	1.40	88.4
18	.....do	1.64	38.0	24	.....do	1.30	86.8
July 4	.....do	1.47	22.2	Aug. 1	.....do	1.30	72.6
27	F. H. Peters	1.28	6.02	19	.....do	1.35	88.2
				27	.....do	1.60	70.0

Discharge measurements of Lee Creek at Cardston, Alta., 1908–1914—Continued.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1911.		*Feet.*	*Sec.-ft.*	1913.		*Feet.*	*Sec.-ft.*
Sept. 8	L. J. Gleeson	2.30	400.0	Jan. 4	V. Meek	1.75	13.4
20	do	1.77	161.7	11	do	2.03	8.1
Oct. 13	do	1.55	85.0	23	do	2.35	6.3
Nov. 4	do	1.41	56.9	Feb. 1	G. F. Deas	2.77	10.6
14	do	1.90	44.0	10	do	3.10	12.6
Dec. 13	D. D. McLeod	1.86	32.9	15	do	3.20	14.0
1912.				22	do	3.25	12.6
Jan. 3	D. D. McLeod	1.90	21.12	Mar. 10	do	3.16	51.0
20	do	2.66	29.0	Apr. 19	do	1.90	260.0
Feb. 9	do	2.48	21.0	May 6	F. R. Burfield	1.54	129.0
17	do	2.51	14.86	13	do	1.70	183.0
Mar. 7	do	2.31	10.2	29	do	1.94	317.0
22	do	2.64	16.7	June 11	do	1.63	159.0
Apr. 15	L. J. Gleeson	1.60	115.00	30	do	1.75	223.0
26	do	1.55	111.0	July 5	do	1.47	115.0
May 14	do	1.55	104.0	17	do	1.24	53.0
27	do	1.70	148.2	Aug. 3	do	1.19	38.0
June 6	L. J. Gleeson	1.43	87.9	23	do	1.11	26.0
6	do	1.43	88.7	Sept. 11	do	1.04	16.7
17	do	1.35	65.8	25	L. Danielsen	1.01	20.0
26	do	1.15	35.5	Oct. 7	do	1.10	28.0
July 5	do	1.27	49.1	16	do	1.20	38.0
15	do	1.38	69.3	28	do	1.15	25.0
26	do	1.35	65.86	Nov. 10	do	1.14	36.0
Aug. 5	V. Meek	1.25	48.2	1914.			
12	do	1.11	29.5	Mar. 21	O. H. Hoover	1.37	39.0
12	do	1.11	30.3	Apr. 4	do	1.47	71.0
22	do	.95	17.83	18	do	1.38	82.0
Sept. 2	do	.93	17.00	May 4	do	1.56	135.0
12	do	.81	12.59	22	do	1.52	117.0
Oct. 9	G. F. Deas	1.05	29.19	June 8	do	1.36	74.0
19	do	1.06	29.2	20	do	1.35	72.0
Nov. 2	do	1.12	29.19	July 1	do	1.28	55.0
12	do	1.10	31.45	11	do	1.15	34.0
22	V. Meek	1.16	35.3	Aug. 6	do	.90	9.2
28	do	1.15	21.6	Sept. 1	do	1.05	13.9
Dec. 7	do	1.68	21.5	30	W. A. Burton	1.03	13.0
14	do	1.50	18.3	Oct. 7	O. H. Hoover	1.17	33.8
28	do	1.70	9.82	19	do	1.59	144.0
				Nov. 7	do	1.29	55.8

Daily discharge, in second-feet, of Lee Creek, at Cardston, Alta., 1909–1914.

Day.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	June.	July.	Aug.	Sept.	Oct.	Nov.
1909.							1909.						
1	.....	198.0	.....	23.0	10.0	7.0	16	.....	106.0	39.0	20.0	10.0	.....
2	.....	198.0	.....	23.0	10.0	7.0	17	.....	106.0	39.0	15.0	11.0	.....
3	.....	166.0	.....	26.0	10.0	10.0	18	.....	77.0	39.0	23.0	12.0	.....
4	.....	166.0	.....	29.0	10.0	12.0	19	.....	77.0	39.0	23.0	11.0	.....
5	.....	166.0	.....	26.0	10.0	16.5	20	.....	77.0	39.0	20.0	10.0	.....
6	.....	230.0	.....	23.0	7.0	15.0	21	.....	48.0	39.0	20.0	10.0	.....
7	.....	166.0	.....	20.0	8.5	13.5	22	.....	48.0	39.0	18.0	10.0	.....
8	.....	166.0	.....	18.0	10.0	12.0	23	.....	48.0	23.0	16.5	11.0	.....
9	.....	166.0	.....	15.0	10.0	10.0	24	.....	48.0	23.0	15.0	13.5	.....
10	.....	136.0	.....	10.0	10.0	10.0	25	.....	48.0	23.0	13.5	12.0	.....
11	.....	136.0	55.0	23.0	12.0	.....	26	.....	48.0	23.0	12.0	11.0	.....
12	.....	136.0	55.0	39.0	12.0	.....	27	.....	.....	23.0	11.0	10.0	.....
13	.....	136.0	55.0	29.0	10.0	.....	28	198.0	.....	23.0	10.0	10.0	.....
14	.....	136.0	55.0	26.0	10.0	.....	29	198.0	.....	23.0	10.0	7.0	.....
15	.....	106.0	55.0	23.0	10.0	.....	30	198.0	.....	23.0	10.0	7.0	.....
							31	.....	.....	23.0	.....	7.0	.....

Daily discharge, in second-feet, of Lee Creek at Cardston, Alta., 1909–1914—Contd.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1910.								
1	23.8	26.5	50.2	25.0	4.6	14.8	124.0	25.5
2	23.8	39.2	50.2	16.2	4.6	22.0	97.0	25.8
3	23.8	39.2	50.2	16.2	4.7	22.5	97.5	25.8
4	23.8	39.2	50.2	16.2	4.7	23.2	75.0	25.8
5	23.8	26.5	50.0	16.5	4.8	34.8	75.8	25.8
6	23.8	26.5	50.0	16.5	2.0	34.7	54.0	26.0
7	23.8	26.5	71.2	16.5	2.1	50.8	54.8	26.0
8	23.8	28.2	117.8	16.5	2.2	50.2	54.2	26.2
9	35.5	19.8	93.8	16.5	2.5	50.0	54.8	26.2
10	35.5	30.8	71.0	16.5	2.5	49.8	55.0	39.0
11	35.5	46.0	71.0	16.5	2.8	49.5	55.5	.....
12	35.0	46.8	70.8	16.5	3.0	49.2	56.0	.....
13	50.8	47.0	49.2	16.5	6.5	49.0	56.2	.....
14	50.0	47.0	49.0	16.5	6.8	48.5	56.5	.....
15	33.2	47.2	48.8	16.5	7.2	48.0	38.8	.....
16	32.5	47.5	48.5	10.0	7.4	47.5	38.8	.....
17	31.8	62.5	32.8	9.8	7.6	67.5	38.8	.....
18	30.8	91.2	32.5	9.8	7.8	67.0	38.8	.....
19	30.0	138.0	33.0	9.5	8.0	66.2	38.8	.....
20	43.2	115.0	33.5	9.5	8.1	65.8	38.5	.....
21	42.2	115.0	34.0	9.2	8.2	66.5	38.2	.....
22	27.8	92.5	23.0	9.2	8.5	90.0	38.0	.....
23	26.8	92.5	23.2	9.0	8.6	114.8	37.5	.....
24	26.8	92.8	23.5	8.8	8.6	114.8	37.2	.....
25	26.8	70.2	23.8	8.5	8.7	92.2	25.0	.....
26	26.8	70.5	24.0	4.2	8.8	93.2	25.0	.....
27	26.8	70.5	24.2	4.0	8.8	94.0	25.0	.....
28	26.8	70.8	24.5	4.2	8.8	94.5	25.0	.....
29	26.8	71.0	24.8	4.3	14.8	117.8	25.2	.....
30	26.8	71.2	24.8	4.4	14.8	118.2	25.2	.....
31	.....	71.5	.....	4.5	14.8	.....	25.5	.....

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1911.							1911.						
1	242	384	185	56	43	144	16	920	171	49	56	206	.....
2	242	384	185	73	43	144	17	560	172	49	56	206	.....
3	242	384	160	73	56	144	18	440	172	64	56	206	.....
4	242	332	160	94	590	144	19	384	172	64	56	174	.....
5	284	232	160	94	530	144	20	332	173	64	56	144	.....
6	284	264	136	144	412	144	21	284	140	49	56	144	.....
7	242	220	118	174	284	118	22	284	140	49	56	174	.....
8	242	210	118	206	332	118	23	284	140	49	56	174	.....
9	242	205	94	206	332	118	24	284	345	56	56	174	.....
10	242	200	64	174	384	118	25	332	464	56	83	144	.....
11	242	200	49	174	384	118	26	332	464	56	83	144	.....
12	242	200	49	131	440	94	27	332	316	56	83	144	.....
13	284	170	49	94	440	94	28	284	220	56	56	144	.....
14	384	170	49	73	332	94	29	284	180	73	56	144	.....
15	1,400	171	49	73	242	.....	30	332	180	94	56	144	.....
							31	332	.....	73	56	.....	.....

Day.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	Aug.	Sept.	Oct.	Nov.	Dec.
1912.						1912.					
1	32	25	25	25	20	16	32	25	25	45	17.0
2	43	25	25	25	20	17	32	25	25	34	17.0
3	56	25	25	25	20	18	23	25	25	34	16.0
4	56	25	25	25	20	19	21	25	25	34	16.0
5	56	25	25	25	21	20	20	25	25	25	15.0
6	43	25	25	25	21	21	18	25	25	25	15.0
7	43	25	25	25	21	22	17	25	25	25	14.0
8	32	25	25	25	21	23	17	25	25	25	14.0
9	32	25	45	25	20	24	17	25	25	26	13.0
10	32	25	41	45	20	25	13	25	25	25	12.0
11	32	25	25	34	20	26	13	25	25	21	12.0
12	32	25	25	34	19.0	27	13	25	25	15	11.0
13	32	34	25	25	19.0	28	17	25	25	15	10.0
14	32	31	25	34	18.0	29	17	25	25	18	10.0
15	32	25	25	25	18.0	30	17	25	25	20	10.0
						31	17	.....	25	.....	10.0

Daily discharge, in second-feet, of Lee Creek at Cardston, Alta., 1909–1914—Contd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1913.										
1	14.0	10.6	20	86	186	230	204	34	26.0	14.8
2	14.0	10.6	24	150	162	239	166	29	22.0	14.0
3	14.0	11.0	25	235	152	217	148	29	20 0	14.8
4	13.4	11.0	28	315	137	208	123	34	22.0	18.0
5	13.0	11.0	32	445	123	199	104	33	18.0	20.0
6	12.5	11.5	35	490	127	178	98	32	18.0	20.0
7	10.5	11.5	40	620	155	170	104	30	17.2	28.0
8	9.0	11.5	43	653	137	170	92	34	14.0	28.0
9	8.0	12.0	48	578	137	170	81	76	14.0	22.0
10	8.5	12.6	51	298	137	186	71	130	17.2	22.0
11	8.1	13.0	55	293	195	159	71	71	21.0	67.0
12	8.0	13.0	58	298	195	162	69	52	14.0	84.0
13	8.0	13.5	60	298	186	162	62	48	14.0	69.0
14	8.0	13.5	61	288	195	148	56	46	14.0	60.0
15	8.0	14.0	62	278	178	130	52	41	14.0	50.0
16	8.0	14.0	64	283	208	123	52	35	14.0	45.0
17	8.0	13.5	65	283	212	113	46	35	14.0	37.0
18	8.0	13.5	67	288	278	110	45	35	14.0	33.0
19	7.5	13.0	68	278	303	104	41	38	14.0	26.0
20	7.5	13.0	70	278	283	123	40	32	14.0	27.0
21	7.0	13.0	72	248	278	98	37	29	14.0	27.0
22	6.5	12.6	73	230	283	92	38	28	22.0	27.0
23	6.3	13.0	75	199	303	81	38	24	22.0	24.0
24	6.5	14.0	76	199	308	79	35	24	18.0	26.0
25	7.0	15.0	77	190	303	76	34	23	18.8	26.0
26	7.5	15.0	78	190	308	313	141	23	14.0	27.0
27	8.0	16.0	80	190	318	418	104	22	14.0	27.0
28	8.5	18.0	81	186	308	428	46	23	17.2	34.0
29	9.0	.....	82	166	298	313	48	23	18.0	27.0
30	9.5	.....	83	244	278	208	56	27	14.8	27.0
31	10.0	.....	84	.....	273	.....	37	26	.....	29.0

Day.	Mar.	Apr.	May.	June.	July.	Day.	Mar.	Apr.	May.	June.	July.
1914.						1914.					
1	.....	60	110	95	56	16	.....	113	148	98	.....
2	.....	44	130	95	71	17	.....	93	141	92	.....
3	.....	22	130	130	67	18	.....	87	130	84	.....
4	.....	71	127	110	64	19	.....	79	130	71	.....
5	.....	56	130	98	58	20	.....	162	134	69	.....
6	.....	50	130	98	50	21	39	98	127	64	.....
7	.....	42	130	95	46	22	35	104	120	60	.....
8	.....	64	148	56	38	23	25	110	116	52	.....
9	.....	69	186	69	38	24	144	127	120	52	.....
10	.....	48	190	69	30	25	123	110	113	113	.....
11	.....	79	166	69	28	26	107	98	107	127	.....
12	.....	98	166	67	30	27	212	87	101	74	.....
13	.....	113	166	116	27	28	190	90	98	64	.....
14	.....	113	162	148	.....	29	221	87	95	64	.....
15	.....	130	159	101	.....	30	152	84	92	64	.....
						31	60	.....	92	.....	.....

NOTE.—1909: Gage installed June 28, carried out by flood July 27, and reestablished Aug. 11.
1911: Discharge determined by shifting-control method, June 1 to July 6.
1912: No observations during early part of season. Stage-discharge relation affected by ice, Nov. 27 to Dec. 31.
1913: Stage-discharge relation affected by ice, Jan. 1 to Apr. 7 and after Oct. 30.
1914: Stage-discharge relation affected by ice, Mar. 21 to Apr. 4.

Monthly discharge of Lee Creek at Cardston, Alta., 1909–1914.

[Drainage area, 118 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1909.						
June 28–30	198.0	198.0	198.0	1.678	0.19	1,178
July 1–26	230.0	48.0	121.0	1.026	.99	6,226
August 11–31	55.0	23.0	36.0	.305	.24	1,497
September	39.0	10.0	19.7	.166	.19	1,170
October	13.5	7.0	10.1	.085	.10	619
November 1–10	16.5	7.0	11.3	.096	.04	224
The period					1.75	10,914
1910.						
April	51.0	23.8	30.6	.259	.29	1,821
May	138.0	19.8	60.6	.513	.59	3,726
June	118.0	23.0	45.8	.390	.44	2,725
July	25.0	4.0	8.8	.074	.09	541
August	14.8	2.0	6.9	.059	.07	424
September	118.0	14.8	63.7	.540	.60	3,784
October	124.0	25.0	49.2	.417	.48	3,025
November 1–10	39.0	25.5	27.2	.230	.09	540
The period					2.65	16,586
1911.						
May	1,400	242	357	3.03	3.49	21,951
June	464	140	242	2.05	2.29	14,400
July	185	49	83.3	.706	.81	5,122
August	206	56	90.8	.770	.89	5,583
September	590	43	244	2.07	2.31	14,519
October 1–14	144	94	124	1.05	.55	3,444
The period					10.34	65,019
1912.						
August	56	13.0	28.7	.244	.78	1,765
September	34	25	25.6	.217	.24	1,523
October	45	25	26.2	.222	.26	1,611
November	45	15.0	27.0	.229	.26	1,607
December	21	10.0	16.5	.139	.16	1,014
The period					1.20	7,520
1913.						
January	14.0	16.3	9.09	.077	.09	559
February	18.0	10.6	13.00	.110	.12	722
March	84.0	20.0	59.30	.502	.58	3,646
April	653.0	86.0	293.00	2.480	2.77	17,435
May	318.0	123.0	224.00	1.900	2.19	13,773
June	428.0	76.0	180.00	1.530	1.71	10,711
July	204.0	34.0	75.40	.639	.74	4,636
August	130.0	22.0	37.60	.319	.37	2,312
September	26.0	14.0	16.90	.143	.16	1,005
October	84.0	14.0	32.30	.274	.32	1,986
The period					9.05	56,785
1914.						
March 21–31	221	25	119	1.010	.41	2,596
April	162	22	86	.729	.81	5,117
May	190	92	132	1.120	1.29	8,116
June	148	52	86	.729	.81	5,117
July 1–13	71	27	46	.390	.19	1,186
The period					3.51	22,132

PINEPOUND CREEK NEAR SPRING COULEE, ALTA.[a]

LOCATION.—In NE. ¼ sec. 29, T. 4, R. 23 W. fourth meridian, half a mile due west of Spring Coulee village, 200 yards upstream from traffic bridge, on road allowance between sections 29 and 32.

DRAINAGE AREA.—As much of the flow past this station is waste water from the Alberta Railway & Irrigation Co.'s canal, the drainage area has not been computed.

RECORDS AVAILABLE.—April 30, 1914, to October 31, 1917.

GAGE.—Vertical staff nailed to timber driven into bed of stream and braced to right bank; read by H. E. Loveday.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed of creek sand and gravel. Right bank consists of sand and gumbo; high and not subject to overflow; left bank consists of gravel, and rises gradually to above high-water mark. One channel at all stages. Control shifts.

EXTREMES OF DISCHARGE.—1914–1917. Maximum stage recorded 3.73 feet, April 30, 1914 (discharge, 219 second-feet); minimum stage recorded, "dry" during various periods.

ICE.—Observations discontinued during winter season; flow negligible.

ACCURACY.—Stage-discharge relation not permanent. Rating curves fairly well defined. Gage read to hundredths daily. Records poor.

Discharge measurements of Pinepound Creek near Spring Coulee, Alta., 1914–1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*	1916		*Feet.*	*Sec.-ft.*
Apr. 30	O. H. Hoover	3.73	218.0	Mar. 20	S. H. Frame	2.66	2.50
May 1	do	3.36	88.0	Apr. 14	do	2.64	5.00
20	do	3.26	52.0	May 9	do	2.49	1.73
June 10	do	3.12	40.0	27	do	2.72	8.60
30	do	2.92	16.0	July 17	W. A. Burton	2.68	6.70
July 14	do	2.90	13.1	Aug. 21	S. H. Frame	2.34	[b].09
24	do	2.84	10.9	Sept. 18	W. A. Burton	2.35	[b].06
Aug. 7	do	2.74	6.7	Oct. 9	S. H. Frame	2.35	[b].16
15	do	2.73	5.5				
28	do	2.72	5.4	1917.			
Sept. 16	do	2.71	4.3	Apr. 17	A. W. P. Lowrie	2.68	1.45
24	do	2.70	4.4	May 11	W. A. Burton	2.37	.58
Oct. 2	do	2.71	4.6	June 6	A. W. P. Lowrie	2.37	.54
				24	do	2.31	.48
1915.				July 16	W. A. Burton	2.30	0
Mar. 23	J. E. Dengan	3.22	56.0	Aug. 3	A. W. P. Lowrie	Dry.	0
Apr. 16	V. A. Newhall	2.60	2.6	15	do	Dry.	0
May 17	do	2.60	3.6	Sept. 13	do	2.35	0
June 4	W. A. Burton	2.62	4.3	27	do	2.35	0
24	V. A. Newhall	2.65	3.7	Oct. 31	do	2.65	3.70
July 9	do	2.61	2.7				
31	do	3.19	53.0				
Sept. 7	W. A. Burton	2.63	2.4				
28	do	2.61	2.5				

[a] Formerly called "Pinepound Creek at Packard's farm."
[b] Discharge determined by using a 6-inch weir.

Daily discharge, in second-feet, of Pinepound Creek near Spring Coulee, Alta., 1914–1917.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1914.								
1	.....	.....	114.0	50.0	12.4	6.0	6.0	4.8
2	.....	.....	117.0	53.0	13.0	6.0	5.7	4.8
3	.....	.....	57.0	51.0	13.0	6.0	5.7	5.4
4	.....	.....	63.0	61.0	14.4	6.0	5.7	129.0
5	.....	.....	57.0	45.0	13.7	5.7	5.7	133.0
6	.....	.....	53.0	45.0	13.7	5.7	5.7	9.2
7	.....	.....	11.7	45.0	13.0	5.7	5.4	8.0
8	.....	.....	11.1	43.0	13.0	5.7	5.4	7.0
9	.....	.....	10.5	42.0	13.7	6.0	5.4	7.5
10	.....	.....	11.1	40.0	13.7	5.7	5.7	4.5
11	.....	.....	9.8	39.0	14.4	5.4	5.7	4.5
12	.....	.....	8.2	39.0	14.4	5.7	5.7	4.3
13	.....	.....	8.0	40.0	15.0	5.4	5.4	3.0
14	.....	.....	13.0	37.0	15.0	5.4	5.4	3.0
15	.....	.....	72.0	39.0	15.0	5.1	5.4	3.9
16	.....	.....	72.0	39.0	15.0	5.4	5.1	8.5
17	.....	.....	48.0	39.0	15.0	5.4	4.8	9.8
18	.....	.....	48.0	37.0	15.1	5.7	4.8	9.8
19	.....	.....	48.0	37.0	13.0	5.4	4.8	12.4
20	.....	.....	47.0	19.5	15.0	5.4	4.8	8.5
21	.....	.....	47.0	16.8	15.0	5.4	4.8	6.5
22	.....	.....	50.0	17.7	15.0	5.4	4.8	4.5
23	.....	.....	48.0	16.8	13.7	5.4	4.8	3.0
24	.....	.....	50.0	15.1	11.8	5.4	4.5	2.8
25	.....	.....	51.0	15.1	11.8	5.7	4.5	2.8
26	.....	.....	47.0	13.7	11.1	5.4	4.8	2.8
27	.....	.....	48.0	13.7	10.5	5.4	4.8	2.6
28	.....	.....	48.0	15.0	9.8	5.4	4.8	2.4
29	.....	.....	47.0	15.0	99.0	5.4	4.5	2.4
30	.....	219	51.0	16.8	11.7	5.7	4.8	2.0
31	.....	.....	53.0	.....	6.0	6.0	.....	2.0
1915.								
1	.....	13.5	21.0	1.8	17.5	48.0	2.0	2.9
2	.....	18.4	17.5	2.6	3.5	21.0	2.9	3.5
3	.....	14.3	14.3	2.9	2.9	4.7	4.3	3.9
4	.....	12.9	15.1	2.6	2.0	3.9	3.2	2.9
5	.....	8.5	2.9	3.2	2.0	3.2	2.9	3.5
6	.....	7.5	2.3	4.3	1.8	3.5	2.3	3.2
7	.....	6.0	2.6	6.5	2.0	3.9	2.9	3.9
8	.....	3.9	2.0	5.1	1.8	3.2	3.2	3.5
9	.....	3.2	2.0	5.5	2.3	3.5	2.6	2.9
10	.....	3.2	1.8	4.3	2.0	3.9	3.5	3.2
11	.....	2.6	2.0	4.7	1.8	3.2	3.2	3.2
12	.....	2.3	2.0	5.1	2.0	2.9	3.9	3.5
13	.....	1.8	1.8	4.7	2.0	3.9	4.3	3.2
14	.....	1.6	3.2	3.9	2.3	2.9	3.5	3.2
15	.....	2.0	4.7	5.1	2.0	3.2	2.9	2.9
16	.....	2.0	2.6	3.9	2.0	2.9	2.3	2.6
17	.....	1.8	2.0	4.3	2.3	2.3	2.9	2.6
18	.....	1.6	2.3	4.7	2.9	1.2	4.3	2.3
19	.....	1.2	1.8	4.7	2.6	2.0	3.5	2.3
20	.....	1.0	2.0	4.3	2.3	2.3	3.2	2.0
21	.....	.6	1.8	3.5	2.0	4.3	3.5	2.0
22	.....	1.8	1.6	2.9	2.0	2.9	3.9	1.8
23	57.0	1.0	1.8	3.2	2.6	2.0	3.5	2.0
24	34.0	.8	1.8	3.5	2.3	2.6	4.3	1.8
25	22.0	.4	1.6	3.2	2.0	2.3	3.9	1.6
26	7.0	.2	1.8	46.0	2.0	1.8	4.7	1.4
27	3.5	.0	2.0	30.0	2.3	2.0	3.2	1.0
28	4.7	183.0	1.8	52.0	82.0	2.0	2.3	.8
29	6.0	96.0	2.0	49.0	17.5	1.6	2.0	.4
30	10.0	32.5	2.0	48.0	4.7	2.3	2.6	.0
31	12.3	.....	2.3	.....	49.0	2.9	.....	.0

Daily discharge, in second-feet, of Pinepound Creek near Spring Coulee, Alta., 1914–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1916.								
1	.....	14.00	1.45	6.3	2.60	2.10	0.46	0.67
2	.....	14.50	1.45	6.7	.55	2.10	.55	.55
3	.....	15.60	1.60	12.4	.55	2.40	.46	.67
4	.....	12.40	1.75	12.4	.46	2.60	.46	.91
5	.....	7.60	2.30	11.3	.46	2.40	.55	1.03
6	.....	7.60	2.30	11.8	1.75	2.40	.55	.91
7	.....	7.20	2.30	7.2	1.75	2.40	.46	.55
8	.....	6.70	2.10	7.2	1.75	2.60	.55	.67
9	.....	4.30	1.75	7.2	1.75	2.60	.55	.12
10	.....	4.60	1.75	6.3	1.75	2.80	.38	.29
11	.....	5.10	1.90	5.4	1.90	2.60	.38	.38
12	.....	4.80	2.10	5.4	1.90	2.60	.46	.38
13	.....	4.30	2.10	4.8	2.80	3.00	.46	.38
14	.....	5.10	2.30	4.6	4.30	3.30	.55	.67
15	.....	4.30	1.90	4.6	4.80	[a] 1.03	.55	.79
16	.....	4.60	1.90	4.8	5.10	[a] .48	.55	.55
17	.....	4.30	1.90	4.8	6.70	0	.55	.55
18	.....	4.00	2.10	5.4	7.20	0	.12	.67
19	.....	3.80	2.10	7.6	6.70	0	.55	.46
20	5.0	3.00	1.90	7.2	6.30	.38	.55	.55
21	25.0	3.30	1.90	6.7	5.80	.10	.55	.55
22	20.0	3.00	2.10	7.6	5.80	.12	.55	.46
23	15.0	2.80	2.30	5.4	6.30	.12	.46	.38
24	14.5	2.40	3.80	6.3	6.30	.10	.55	.38
25	10.7	2.30	4.30	5.8	5.80	.10	.79	.46
26	10.2	2.30	7.20	5.8	5.80	.10	.55	.29
27	11.8	2.40	8.60	5.1	5.40	.12	.79	.46
28	9.7	2.30	8.10	5.8	5.40	0	.79	.38
29	12.9	1.90	7.60	5.8	5.80	0	.55	.21
30	13.4	1.60	8.60	2.8	1.75	0	.79	.21
31	16.1	.....	5.40	.....	2.10	.46	.....	.21
1917.								
1	.....	.....	1.21	1.12	.50	0	0	0
2	.....	.....	1.04	1.04	.45	0	0	0
3	.....	.....	.96	.96	.40	0	0	0
4	.....	.....	1.12	.87	.38	0	0	0
5	.....	.....	.96	.87	.35	0	0	0
6	.....	.....	.87	.63	.33	0	0	.....
7	.....	.....	.78	.70	.30	0	0	.52
8	.....	.....	.87	.68	.29	0	0	.42
9	.....	.....	.87	.70	.28	0	.93	.42
10	.....	.....	.96	1.12	.27	0	.52	.52
11	.....	.....	.63	22.00	.25	.93	0	.36
12	.....	.....	.87	2.85	.19	.42	0	.....
13	.....	.....	.78	1.30	.11	0	0	14.00
14	.....	.....	.78	1.12	.03	0	0	18.80
15	.....	.....	.70	1.04	0	0	0	20.00
16	.....	.....	.70	1.21	0	0	0	20.00
17	.....	.....	.70	2.10	0	0	0	21.00
18	.....	.....	.78	1.81	0	0	0	22.00
19	.....	.....	.78	1.55	0	0	0	23.00
20	.....	.....	.78	1.68	0	0	0	22.00
21	.....	.....	.87	1.68	0	0	0	35.00
22	.....	1.48	.87	1.55	0	0	0	17.60
23	.....	1.50	.96	1.30	0	0	0	6.80
24	.....	1.15	.96	1.12	0	0	0	7.30
25	.....	1.85	1.04	.70	0	0	0	7.00
26	.....	1.15	1.04	.66	0	0	0	5.30
27	.....	1.40	1.04	.68	0	0	0	5.00
28	.....	1.52	1.81	.66	0	0	0	5.50
29	.....	1.35	1.81	.52	0	0	0	5.00
30	.....	1.45	1.12	.54	0	0	0	4.60
31	.....	.....	1.12	.....	0	0	.....	3.70

[a] Estimated.

NOTE.—1916: Stage-discharge relation affected by ice Mar. 20–23.
1917: Shifting control Apr. 22–29 and June 30–July 15. No flow July 15 to Aug. 10, Aug. 13 to Sept. 8, and Sept. 11 to Oct. 5. Water flowing but no record taken before Apr. 22. Water standing in pools Sept. 11–27.

Monthly discharge of Pinepound Creek near Spring Coulee, Alta., 1914–1917.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1914.				
April 30	219	.....	219.0	434
May	117	8.0	45.8	2,816
June	61	13.7	33.2	1,975
July	99	6.0	16.0	984
August	6	5.1	5.6	344
September	6	4.5	5.2	309
October 1–31	133	2.0	13.3	818
The period	.....	.....	.....	7,681
1915.				
March 23–31	57.0	3.5	17.40	311
April	183.0	0	14.19	844
May	21.0	1.6	4.08	251
June	52.0	1.8	10.85	646
July	82.0	1.8	7.37	453
August	48.0	1.2	4.91	302
September	4.7	2.0	3.26	194
October	3.9	0	2.39	147
The period	.....	.....	.....	3,148
1916.				
March 20–31	25.00	5.00	13.70	326
April	15.60	1.60	5.40	321
May	8.60	1.45	3.20	197
June	12.40	2.80	6.60	393
July	7.20	.46	3.80	234
August	3.30	0	1.26	77
September	.79	.12	.54	32
October	1.03	.12	.51	31
The period	.....	.....	.....	1,611
1917.				
April 22–30	1.52	1.15	1.43	25.0
May	1.81	.63	.96	59.0
June	22.00	.52	1.82	108.0
July	.50	0	.13	8.0
August	.93	0	.04	2.5
September	.93	0	.05	3.0
October	35.00	0	8.58	528.0
The period	.....	.....	.....	733.5

Mean monthly discharge, in second-feet, of Pinepound Creek near Spring Coulee, Alta., 1914–1917.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Total in acre-feet.
1914	.....	[a]219.00	46.00	33.00	16.00	5.60	5.20	13.30	7,680
1915	[a]17.4	14.20	4.10	10.80	7.40	4.90	3.30	2.40	3,148
1916	[a]13.7	5.40	3.20	6.60	3.80	1.26	.54	.51	1,611
1917	.....	[a]1.43	.96	1.82	.13	.04	.05	8.58	733
Average	.....	9.8	13.6	13.1	6.8	3.0	2.3	6.2	3,293
Average run-off, acre-feet	.....	583	836	780	418	184	137	381	3,319

[a] Incomplete: record not included in average.

POTHOLE CREEK NEAR MAGRATH (UPPER STATION), ALTA.

LOCATION.—In the NW. ¼ sec. 10, T. 5, R. 22 W. fourth meridian, 3½ miles south of Magrath, above the spillway of the Alberta Railway & Irrigation Co.'s canal, and about 15 miles above confluence with St. Mary River.

DRAINAGE AREA.—162 square miles.

RECORDS AVAILABLE.—Open-water periods April 27, 1914, to October 31, 1917.

GAGE.—Vertical staff; read by L. A. Harrison.

DISCHARGE MEASUREMENTS.—Made by wading or from cable.

CHANNEL AND CONTROL.—Channel straight for about 100 feet above and 50 feet below gage. Bed composed of fine gravel and stones. Banks high and not subject to overflow. Control consists of gravel and stones likely to shift during flood stages.

EXTREMES OF DISCHARGE.—1914–1917. Maximum stage recorded, 5.41 feet Mar. 10, 1916 (discharge, 626 second-feet); minimum stage recorded, 0.00 feet (no flow) during various periods.

ICE.—Observations discontinued during winter season.

ACCURACY.—Stage-discharge relation permanent except during high stages. Gage read to hundredths once daily. Observations during September and October, 1917, do not appear to be accurate. Daily discharge ascertained by applying daily gage heights to rating table. Record fair.

Discharge measurements of Pothole Creek near Magrath (upper station), Alta., 1914–1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
Apr. 27	O. H. Hoover	0.90	2.01	May 10	S. H. Frame	0.98	3.5
May 20	do	.80	.78	June 8	do	1.65	48.0
June 9	do	.....	0	July 18	W. A. Burton	1.41	20.0
29	do	.....	0	Aug. 11	S. H. Frame	1.81	74.0
July 13	do	.....	0	30	W. A. Burton	1.08	6.6
Sept. 16	do	.....	0	Sept. 18	S. H. Frame	1.19	13.4
1915.				Oct. 13	do	1.36	29.0
Mar. 20	J. E. Degnan	2.170	57.00	1917.			
Apr. 15	V. A. Newhall	1.185	9.00	Apr. 18	A. W. P. Lowrie	1.95	61.0
May 13	do	.950	2.50	May 16	W. A Burton	1.43	25.0
June 4	do	4.200	233.00	June 9	do	1.38	24.0
23	do	1.310	15.00	28	A. W. P. Lowrie	1.28	13.4
July 8	do	1.180	8.20	July 16	do	1.09	4.6
30	do	2.585	106.00	31	do	.....	0
Sept. 6	W. A. Burton	1.250	13.10	Aug. 17	do	.92	[a]2.4
28	V. A. Newhall	1.080	6.80	Sept. 7	do	1.02	3.7
1916.				Oct. 3	do	1.04	3.2
Mar. 20	S. H. Frame	1.94	56.0	Nov. 1	do	1.22	10.3
Apr. 13	do	1.32	18.5				

[a] Stream very shallow; result probably high.

Daily discharge, in second-feet, of Pothole Creek near Magrath (upper station), Alta.

Day.	Apr.	May.	June.	Day.	Apr.	May.	June.	Day.	Apr.	May.	June.
1914.				1914.				1914.			
1	.....	1.28	0.01	11	.....	2.90	.....	21	.....	0.79	.....
2	.....	1.28	.01	12	.....	2.50	.....	22	.....	.79	.....
3	.....	2.40	.01	13	.....	2.00	.....	23	.....	.65	.....
4	.....	2.90	0	14	.....	1.42	.....	24	.....	.59	.....
5	.....	5.60	0	15	.....	1.42	.....	25	.....	.65	.....
6	.....	4.70	0	16	.....	1.18	.....	26	.....	.65	.....
7	.....	3.80	0	17	.....	.98	.....	27	2.00	.45	.....
8	.....	4.90	0	18	.....	.79	.....	28	2.00	.23	.....
9	.....	4.30	0	19	.....	.79	.....	29	2.00	.17	.....
10	.....	3.80	.....	20	.....	.79	.....	30	2.00	.15	.....
								31	.....	.12	.....

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1915.									
1	.....	.....	41.0	3.1	2.2	30.0	22.0	2.9	0
2	.....	.....	48.0	4.3	35.0	27.0	19.6	1.8	0
3	.....	.....	50.0	5.0	348.0	25.0	18.8	4.0	0
4	.....	.....	53.0	4.8	235.0	23.0	16.4	4.0	0
5	.....	.....	27.0	4.3	325.0	16.4	13.4	4.0	0
6	.....	.....	22.0	5.3	181.0	11.0	12.2	11.0	0
7	.....	.....	18.8	7.2	61.0	9.5	10.4	4.0	0
8	.....	.....	16.4	6.1	41.0	8.0	6.6	4.0	0
9	.....	.....	12.5	5.3	39.0	6.6	5.0	4.0	0
10	.....	.....	9.5	4.0	33.0	5.3	4.0	5.3	0
11	.....	.....	8.9	2.9	24.0	5.0	4.3	6.6	0
12	.....	.....	8.0	1.8	18.0	5.3	3.6	6.6	0
13	.....	.....	9.5	1.3	19.2	5.6	3.6	8.0	0
14	.....	85.0	9.2	2.9	20.0	5.3	4.0	9.5	0
15	.....	172.0	7.7	54.0	22.0	5.6	4.3	9.5	0
16	.....	316.0	7.2	41.0	22.0	5.6	47.0	11.0	0
17	.....	398.0	7.2	118.0	24.0	5.8	47.0	11.0	0
18	.....	284.0	7.7	78.0	23.0	6.3	44.0	16.0	0
19	.....	172.0	5.3	30.0	132.0	7.2	42.0	12.5	0
20	.....	65.0	4.8	25.0	48.0	8.0	38.0	11.6	0
21	.....	135.0	4.5	16.8	14.0	8.0	22.0	10.4	0
22	.....	217.0	4.0	14.0	15.6	7.7	9.5	9.2	.04
23	.....	208.0	4.0	13.1	12.5	8.0	9.5	6.1	.07
24	.....	136.0	3.8	11.9	13.1	8.0	6.6	3.1	.11
25	.....	126.0	3.6	10.1	150.0	8.6	6.6	1.2	.13
26	.....	63.0	3.1	9.5	118.0	8.9	4.0	.5	.15
27	.....	37.0	2.7	8.0	114.0	19.2	4.0	.3	.18
28	.....	20.0	2.2	6.6	115.0	45.0	4.0	6.1	.20
29	.....	20.0	1.8	4.5	74.0	90.0	4.0	.0	.26
30	.....	24.0	2.0	3.1	47.0	101.0	2.9	.0	.28
31	.....	28.0	.....	2.7	.....	38.0	2.9	.....	.32

Daily discharge, in second-feet, of Pothole Creek near Magrath (upper station), Alta.—Continued.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1916.									
1	.....	50.0	17.9	9.5	115	69.0	2.50	5.9	7.0
2	.....	59.0	19.0	10.4	99	68.0	2.50	17.3	11.4
3	.....	64.0	18.4	10.9	84	60.0	2.00	173.0	11.4
4	.....	68.0	17.9	10.9	93	50.0	1.86	218.0	14.1
5	.....	64.0	18.4	7.0	206	43.0	1.44	230.0	19.5
6	.....	53.0	20.0	4.7	176	35.0	1.44	219.0	19.5
7	.....	50.0	21.0	4.4	96	48.0	1.30	158.0	17.9
8	.....	188.0	23.0	4.4	48	40.0	1.10	142.0	16.8
9	.....	254.0	20.0	4.2	44	35.0	71.00	101.0	24.0
10	.....	319.0	12.5	3.5	57	29.0	238.00	70.0	25.0
11	.....	290.0	10.9	3.9	71	28.0	126.00	45.0	25.0
12	.....	276.0	10.0	3.9	52	23.0	99.00	24.0	25.0
13	.....	174.0	17.9	5.6	48	20.0	56.00	63.0	29.0
14	.....	142.0	7.8	6.6	44	17.9	48.00	49.0	22.0
15	.....	92.0	6.6	5.9	35	15.7	38.00	37.0	21.0
16	.....	77.0	6.6	5.6	29	13.6	30.00	25.0	18.4
17	.....	69.0	6.3	4.7	25	8.2	30.00	19.5	16.8
18	.....	62.0	5.2	4.2	22	20.0	29.00	13.6	15.7
19	.....	41.0	4.4	4.2	40	10.9	28.00	16.8	13.6
20	.....	56.0	3.9	3.9	45	10.9	25.00	13.6	13.6
21	.....	43.0	3.9	3.9	46	10.9	23.00	10.4	14.1
22	123	35.0	3.5	7.8	55	10.9	21.00	10.0	15.2
23	115	26.0	3.5	14.1	57	10.0	20.00	8.2	15.2
24	115	21.0	3.3	140.0	57	9.0	19.50	7.8	14.6
25	111	17.9	3.3	290.0	54	10.9	19.00	7.0	14.6
26	109	17.3	3.5	257.0	50	9.0	16.30	7.0	14.1
27	79	17.3	3.5	214.0	49	7.4	10.40	7.0	14.6
28	53	18.4	3.7	200.0	151	5.2	8.60	7.0	15.2
29	48	19.0	5.9	185.0	143	4.7	8.60	7.0	15.7
30	.....	17.9	8.6	163.0	113	3.7	6.30	7.0	16.3
31	.....	18.4	.....	148.0	.....	3.3	7.00	.....	16.8
1917.									
1	.....	.....	232	83.0	47.0	15.1	0	0	9.4
2	.....	.....	89	79.0	44.0	15.1	0	0	8.9
3	.....	.....	103	72.0	44.0	12.1	0	0	3.2
4	.....	.....	118	68.0	42.0	12.1	0	0	5.5
5	.....	.....	132	65.0	40.0	12.1	0	0	4.1
6	.....	.....	154	65.0	38.0	9.4	0	0	3.6
7	.....	.....	197	58.0	34.0	9.4	0	3.70	3.4
8	.....	.....	291	58.0	30.0	9.4	0	3.30	3.1
9	.....	.....	240	54.0	22.0	7.0	7.00	15.80	3.1
10	.....	.....	248	54.0	50.0	7.0	7.00	15.80	3.1
11	.....	.....	226	43.0	151.0	7.0	5.10	12.70	3.1
12	.....	.....	197	40.0	158.0	5.1	5.10	9.90	3.1
13	.....	.....	168	36.0	101.0	5.1	15.10	7.50	3.1
14	.....	.....	140	29.0	58.0	5.1	5.10	7.50	3.1
15	.....	.....	147	26.0	40.0	3.9	2.80	9.90	5.1
16	.....	.....	68	25.0	33.0	3.9	2.00	15.80	5.1
17	.....	.....	61	15.1	29.0	3.9	1.80	23.00	9.4
18	.....	.....	61	15.1	26.0	3.9	1.40	23.00	15.1
19	.....	.....	42	15.1	22.0	3.1	.70	19.30	22.0
20	.....	.....	33	18.6	24.0	3.1	0	9.40	26.0
21	.....	.....	101	18.6	22.0	3.1	0	5.10	29.0
22	.....	.....	94	19.3	22.0	3.1	0	5.10	29.0
23	.....	.....	88	29.0	22.0	3.1	0	12.10	36.0
24	.....	.....	72	58.0	22.0	1.0	0	22.00	50.0
25	.....	.....	72	83.0	22.0	0	0	29.00	36.0
26	.....	356	68	79.0	22.0	0	0	26.00	29.0
27	.....	[a] 300	72	68.0	21.0	0	0	22.00	36.0
28	.....	232	76	65.0	13.4	0	0	18.60	29.0
29	.....	232	79	101.0	15.1	0	0	14.50	29.0
30	.....	230	86	101.0	15.1	0	0	12.10	29.0
31	.....	232	.....	72.0	.....	.....	0	.....	29.0

[a] Estimated.

NOTE.—1914: No flow after June 9.
1916: Control shifting May 24–June 28, July 15–20, Aug. 9–21, and Sept. 2–23.
1917: No flow July 25 to Aug. 8 and Aug. 20 to Sept. 6.

Monthly discharge of Pothole Creek near Magrath (upper station), Alta., 1914–1917.

(Drainage area, 162 square miles.)

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1914.						
April 27–30	2.00	2.00	2.00	0.012	0.002	16
May	5.60	.12	1.77	.011	.012	109
June	.01	.00	.....	.....	.....	0
The period	.....	.....	.....	.....	.014	125
1915.						
March 14–31	398.00	20.0	139.00	.8590	.5700	4,969
April	53.00	1.8	13.50	.0830	.0930	804
May	118.00	1.3	16.30	.1010	.1160	1,001
June	348.00	2.2	77.50	.4790	.5340	4,613
July	101.00	5.0	18.20	.1120	.1290	1,119
August	47.00	2.9	19.80	.1220	.1410	1,216
September	16.00	.0	6.10	.0380	.0420	365
October	.32	.0	.06	.0003	.0004	3
The period	.....	.....	.....	.....	1.6254	14,090
1916.						
February 22–29	123.	48.0	94.0	.580	.17	1,492
March	319.	17.3	87.0	.537	.62	5,349
April	23.	3.3	10.3	.064	.07	613
May	290.	3.5	56.0	.346	.40	3,443
June	206.	22.0	73.0	.451	.50	4,344
July	69.	3.3	24.0	.148	.17	1,476
August	238.	1.1	32.0	.198	.23	1,968
September	230.	5.9	57.0	.352	.39	3,392
October	29.	7.0	17.2	.106	.12	1,058
The period	.....	.....	.....	.....	2.67	23,135
1917.						
March 26–31	356.0	230.0	264.00	1.630	.36	3,142
April	291.0	33.0	125.00	.772	.86	7,438
May	101.0	15.1	52.00	.321	.37	3,197
June	158.0	15.0	41.00	.253	.28	2,440
July	15.1	0	5.30	.033	.04	326
August	15.1	0	1.71	.011	.01	105
September	29.0	0	11.40	.070	.08	678
October	50.0	3.1	16.20	.100	.12	996
The period	.....	.....	.....	.....	2.12	18,322

Mean monthly discharge, in second-feet, of Pothole Creek (upper station) near Magrath, Alta., 1914–1917.

Year.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Total in acre-feet.
1914	.....	.....	*a* 2.0	1.77	0	0	0	0	0	125
1915	.....	*a* 139	13.5	16.30	78	18.2	19.80	6.1	0.06	14,090
1916	*a* 94	87	10.3	56.00	73	24.0	32.00	57.0	17.20	23,135
1917	.....	*a* 264	125.0	52.00	41	5.3	1.71	11.4	16.20	18,322
Average	.....	50	50	32	48	11.9	13.4	18.6	8.4	13,918
Average run-off, acre-feet	.....	3,074	2,975	1,968	2,856	732	824	1,107	516	14,052
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	87

a Partial record not included in average.

POTHOLE CREEK NEAR MAGRATH (LOWER STATION), ALTA.

LOCATION.—In NE. ¼ sec. 1, T. 6, R. 22 W. fourth meridian, 3 miles northeast of Magrath, 4 miles below spillway of the Alberta Railway & Irrigation Co's. canal.

DRAINAGE AREA.—Not computed, as part of the flow past this station is waste water from the Alberta Railway & Irrigation Co.'s canal.

RECORDS AVAILABLE.—April 28, 1914, to October 31, 1917.

GAGE.—Chain gage on left bank, read by John Brown.

DISCHARGE MEASUREMENTS.—Made by wading or from cable.

CHANNEL AND CONTROL.—Bed, composed of sand; constantly shifting. Banks low and subject to overflow. Control likely to shift.

EXTREMES OF DISCHARGE.—1914–1917. Maximum stage recorded, 4.50 feet June 28, 1916 (discharge, 1,300 second-feet); minimum stage recorded, zero, October 10 to 14 and 22 to 31, 1914.

ICE.—Observations discontinued during winter season.

ACCURACY.—Stage-discharge relation not permanent. Owing to unstable nature of control and stream bed rating curves are very poorly defined. Gage read daily to hundredths. Daily discharge obtained by applying daily gage heights to rating tables and applying corrections for periods of shifting control. Record poor.

Discharge measurements of Pothole Creek near Magrath (lower station), Alta., 1914–1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
Apr. 28	O. H. Hoover	0.90	1.97	Mar. 20	S. H. Frame	2.23	83.0
May 20	do	1.81	70.00	Apr. 13	do	1.72	22.0
June 9	do	1.95	94.00	May 10	do	2.25	76.0
29	do	2.17	79.00	June 7	do	2.73	145.0
July 13	do	1.93	[a] 132.00	July 18	W. A. Burton	2.74	143.0
24	do	1.86	148.00	Aug. 11	S. H. Frame	3.08	275.0
Aug. 7	do	1.74	114.00	30	W. A. Burton	2.56	116.0
15	do	1.47	66.00	Sept. 18	S. H. Frame	2.16	64.0
28	do	2.14	232.00	Oct. 13	do	1.90	43.0
Sept. 16	do	1.43	80.00				
24	W. A. Burton	1.33	61.00	1917.			
				Apr. 18	A. W. P. Lowrie	2.36	104.0
1915.				May 16	W. A. Burton	2.21	72.0
Mar. 20	J. E. Degnan	2.230	76.0	June 9	do	2.16	53.0
Apr. 15	V. A. Newhall	1.500	8.8	28	A. W. P. Lowrie	2.23	86.0
May 13	do	1.920	52.0	July 16	do	2.07	52.0
June 4	do	4.155	567.0	31	do	1.96	46.0
23	do	2.820	147.0	Aug. 16	do	2.59	96.0
July 8	do	2.680	114.0	Sept. 7	do	2.11	56.0
30	do	3.130	261.0	Oct. 3	do	1.74	19.7
Sept. 6	W. A. Burton	2.420	78.0	Nov. 1	do	1.50	11.3
28	V. A. Newhall	2.230	62.0				

[a] Station moved July 13, 1914.

Daily discharge, in second-feet, of Pothole Creek near Magrath (lower station), Alta., 1914–1917.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1914.									
1	.....	.....	.....	213	163	125	130	200	56
2	.....	.....	.....	180	95	113	519	200	56
3	.....	.....	.....	105	76	111	519	200	56
4	.....	.....	.....	140	101	113	174	200	165
5	.....	.....	.....	153	105	125	161	200	660
6	.....	.....	.....	117	128	150	161	200	200
7	.....	.....	.....	165	428	138	161	200	92
8	.....	.....	.....	165	228	138	152	189	92
9	.....	.....	.....	190	95	150	109	185	56
10	.....	.....	.....	188	114	600	89	189	0
11	.....	.....	.....	188	549	150	89	178	0
12	.....	.....	.....	178	580	170	87	189	0
13	.....	.....	.....	101	611	132	89	200	0
14	.....	.....	.....	178	636	120	89	178	0
15	.....	.....	.....	21	220	112	80	123	56
16	.....	.....	.....	136	660	146	74	112	56
17	.....	.....	.....	136	649	139	76	106	56
18	.....	.....	.....	44	285	141	78	102	56
19	.....	.....	.....	42	156	164	80	102	40
20	.....	.....	.....	68	203	156	82	112	27
21	.....	.....	.....	34	612	148	91	92	4
22	.....	.....	.....	58	146	149	87	56	0
23	.....	.....	.....	85	142	172	195	56	0
24	.....	.....	.....	75	164	145	267	56	0
25	.....	.....	.....	76	135	140	242	56	0
26	.....	.....	.....	76	107	136	197	92	0
27	.....	.....	.....	105	103	140	315	56	0
28	.....	.....	2.00	68	88	140	304	56	0
29	.....	.....	2.00	44	78	70	292	61	0
30	.....	.....	1.60	473	108	140	292	56	0
31	.....	.....	.....	478	.....	130	200	.....	0
1915.									
1	.....	.....	38.0	85.0	119.0	93	a 204	50	76
2	.....	.....	38.0	73.0	120.0	94	a 189	a 67	81
3	.....	.....	56.0	a 64.0	a 322.0	a 91	173	101	a 81
4	.....	.....	a 44.0	a 63.0	577.0	a 90	a 172	a 86	81
5	.....	.....	34.0	63.0	520.0	87	171	a 74	87
6	.....	.....	30.0	64.0	a 394.0	153	123	65	a 123
7	.....	.....	28.0	46.0	a 274.0	a 132	122	54	178
8	.....	.....	a 25.0	42.0	170.0	115	a 102	a 54	a 186
9	.....	.....	23.0	a 40.0	173.0	a 108	93	54	191
10	.....	.....	17.0	38.0	a 175.0	103	a 92	a 56	a 110
11	.....	.....	a 16.4	a 42.0	178.0	a 103	89	59	a 67
12	.....	.....	16.4	46.0	153.0	104	76	a 58	48
13	.....	.....	15.8	51.0	a 153.0	a 104	a 80	a 58	48
14	.....	.....	15.8	107.0	153.0	105	87	58	a 44
15	.....	115.0	14.0	a 141.0	153.0	a 105	a 87	58	42
16	.....	225.0	14.0	a 185.0	a 165.0	106	87	a 51	42
17	.....	686.0	14.0	233.0	178.0	260	178	45	a 42
18	.....	686.0	11.0	a 194.0	a 175.0	a 196	a 165	45	42
19	.....	99.0	8.0	160.0	175.0	190	153	a 45	a 41
20	.....	70.0	6.0	a 119.0	a 160.0	142	a 123	46	40
21	.....	a 126.0	6.0	85.0	a 148.0	142	101	a 46	a 40
22	.....	199.0	5.6	84.0	134.0	a 132	a 76	46	40
23	.....	204.0	5.6	a 91.0	151.0	132	60	a 50	39
24	.....	212.0	5.6	99.0	a 141.0	a 133	a 57	54	a 39
25	.....	a 135.0	5.6	124.0	132.0	a 135	54	54	39
26	.....	81.0	3.6	a 122.0	520.0	136	a 54	a 56	38
27	.....	11.0	3.2	120.0	a 346.0	138	54	a 59	a 38
28	.....	a 18.8	a 25.0	a 126.0	a 191.0	a 254	54	62	38
29	.....	26.0	61.0	129.0	87.0	400	a 54	a 69	a 38
30	.....	30.0	99.0	a 126.0	67.0	260	54	76	38
31	.....	a 34.0	.....	120.0	.....	221	54	.....	a 38

a Estimated.

Daily discharge, in second-feet, of Pothole Creek near Magrath (lower station), Alta., 1914–1917—Continued.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1916.									
1	.....	a 3.0	37.0	a 70.0	278	a 284	148	106	44.0
2	.....	a 3.0	37.0	66.0	278	a 238	155	363	46.0
3	.....	2.0	37.0	68.0	a 230	193	158	387	165.0
4	.....	2.0	a 37.0	74.0	190	232	171	503	167.0
5	.....	a 2.0	37.0	a 74.0	154	206	144	353	147.0
6	.....	3.0	32.0	74.0	353	187	138	321	145.0
7	.....	3.0	a 32.0	a 72.0	142	189	140	189	132.0
8	.....	a 10.0	32.0	71.0	a 105	196	116	121	130.0
9	.....	30.0	a 30.0	71.0	68	185	720	137	73.0
10	.....	a 80.0	28.0	74.0	a 80	198	346	373	51.0
11	.....	408.0	28.0	74.0	93	191	375	387	41.0
12	.....	a 408.0	a 25.0	a 75.0	132	173	278	422	39.0
13	.....	408.0	22.0	76.0	113	167	204	404	37.0
14	.....	58.0	a 18.0	74.0	a 100	140	203	353	28.0
15	.....	a 50.0	14.0	68.0	88	125	177	137	36.0
16	.....	43.0	a 14.0	a 55.0	a 88	189	144	128	29.0
17	.....	a 38.0	14.0	42.0	88	115	164	137	44.0
18	.....	33.0	a 14.0	54.0	a 62	143	238	64	32.0
19	.....	a 52.0	14.0	a 48.0	37	164	195	142	28.0
20	.....	71.0	14.0	42.0	a 52	116	172	81	30.0
21	.....	a 69.0	8.0	21.0	68.	132	170	60	27.0
22	.....	68.0	8.0	57.0	93	88	172	58	40.0
23	.....	68.0	a 8.0	99.0	86	103	155	46	42.0
24	.....	a 57.0	8.0	a 270.0	a 88	108	162	53	39.0
25	.....	46.0	8.0	441.0	a 90	116	141	60	36.0
26	.....	a 44.0	5.6	900.0	93	126	155	61	27.0
27	.....	42.0	8.0	503.0	140	172	134	57	41.0
28	a 1.0	37.0	a 28.0	a 324.0	1,300	164	134	54	23.0
29	a 2.0	a 42.0	a 60.0	145.0	337	146	126	64	16.6
30	.....	46.0	86.0	a 146.0	a 330	153	116	52	27.0
31	.....	37.0	.....	147.0	.....	152	111	.....	11.4
1917.									
1	.....	.....	a 529	113	75	101	41.0	30.0	13.0
2	.....	.....	a 538	89	71	150	38.0	15.0	14.0
3	.....	.....	a 303	47	53	138	41.0	6.0	19.7
4	.....	.....	a 200	105	51	111	40.0	21.0	12.5
5	.....	.....	a 456	103	49	90	41.0	39.0	2.0
6	.....	.....	a 529	50	49	115	42.0	32.0	5.0
7	.....	.....	a 857	75	50	112	40.0	56.0	12.0
8	.....	.....	a 941	108	48	185	41.0	2.0	30.0
9	.....	.....	a 744	82	53	95	42.0	4.5	15.0
10	.....	.....	a 500	75	70	104	40.0	21.0	40.0
11	.....	.....	a 689	75	460	107	166.0	35.0	41.0
12	.....	.....	a 823	60	a 610	126	45.0	104.0	205.0
13	.....	.....	224	57	309	94	150.0	122.0	261.0
14	.....	.....	192	62	61	88	34.0	99.0	163.0
15	.....	.....	172	69	57	75	49.0	70.0	183.0
16	.....	.....	73	72	64	52	96.0	65.0	156.0
17	.....	.....	139	74	102	55	26.0	30.0	247.0
18	.....	.....	104	68	126	57	17.0	20.0	162.0
19	.....	.....	102	65	73	55	31.0	135.0	180.0
20	.....	.....	105	87	61	56	6.0	42.0	200.0
21	.....	.....	180	95	185	55	27.0	16.0	44.0
22	.....	.....	169	90	116	56	18.0	10.0	79.0
23	.....	.....	128	88	107	55	25.0	23.0	2.0
24	.....	.....	93	86	110	53	45.0	34.0	2.5
25	.....	.....	105	110	125	40	6.0	18.0	7.0
26	.....	.....	98	123	107	37	37.0	125.0	5.0
27	.....	.....	110	130	140	39	35.0	100.0	6.0
28	.....	.....	115	150	86	41	5.0	20.0	3.0
29	.....	.....	119	286	141	45	11.0	40.0	6.0
30	.....	.....	300	233	178	44	3.0	35.0	7.0
31	.....	.....	.....	187	.....	46	9.0	.....	31.0

a Estimated.

NOTE.—1914: No flow, Oct. 10 to Oct. 14, Oct. 22 to Oct. 31.
1915: Shifting control, June 4 to July 8 and July 30 to Aug. 13.
1916: Stage-discharge relation affected by ice, Feb. 27 to Mar. 10. Shifting control, July 19 to Aug. 30.
1917: Shifting control, Apr. 15 to Oct. 31.

A. UNITED STATES RECLAMATION SERVICE, ST. MARY CANAL. SIPHON CROSSING ST. MARY RIVER.

B. UNITED STATES RECLAMATION SERVICE CANAL. DROP NO. 2.

Monthly discharge of Pothole Creek near Magrath (lower station), Alta., 1914–1917.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1914.				
April 28–30	2.0	1.6	1.87	11
May	478.0	21.0	138.00	8,485
June	660.0	76.0	259.00	15,412
July	600.0	70.0	152.00	9,346
August	519.0	74.0	177.00	10,883
September	200.0	56.0	133.00	7,914
October 1–21	660.0	0	[a] 65.00	3,997
The period				56,048
1915.				
March 15–31	686	11.0	174.3	5,877
April	99	3.2	22.8	1,358
May	233	38.0	99.4	6,113
June	577	67.0	213.5	12,702
July	400	87.0	147.2	9,053
August	204	54.0	104.4	6,422
September	101	45.0	58.5	3,483
October	191	38.0	67.0	4,120
The period				49,128
1916.				
February 28–29	2	1.0	1.5	6
March	408	2.0	73.0	4,489
April	86	5.6	25.0	1,488
May	900	21.0	141.0	8,670
June	1,300	37.0	179.0	10,651
July	284	88.0	164.0	10,084
August	720	111.0	192.0	11,806
September	503	46.0	189.0	11,246
October	167	11.4	57.0	3,505
The period				61,495
1917.				
April	941	73.0	321	19,101
May	286	47.0	100	6,149
June	610	48.0	126	7,498
July	185	37.0	80	4,919
August	166	3.0	40	2,460
September	135	2.0	46	2,737
October	261	2.0	69	4,243
The period				47,107

[a] Reduced to monthly average.

Mean monthly discharge, in second-feet, of Pothole Creek near Magrath (lower station), Alta., 1914–1917.

Year.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Total in acre-feet.
1914	.....	.....	[a] 1.87	138	259	152	177	133	65	56,048
1915	.....	[a] 174	23.00	99	214	147	104	58	67	49,128
1916	[a] 1.5	73	25.00	141	179	164	192	189	57	61,945
1917	.....	.....	321.00	100	126	80	40	46	69	47,107
Average	.....	73	123	120	194	136	128	106	64	53,557
Average run-off, acre-feet	.....	4,489	7,319	7,379	11,544	8,362	7,870	6,307	3,935	57,205

[a] Incomplete; record not included in average.

STATIONS ON CANALS.

UNITED STATES RECLAMATION SERVICE ST. MARY CANAL AT HUDSON BAY DIVIDE, NEAR BROWNING, MONT.

LOCATION.—At Douglas Bridge on the Hudson Bay divide, 3 miles above the outlet of the canal, 30 miles directly north of Browning on the Blackfeet Indian Reservation. (See Pl. VII *B*.)

RECORDS AVAILABLE.—July 3 to December 31, 1917.

GAGE.—A vertical staff, graduated to tenths and nailed to upstream side of left pier of bridge; read once a day by ditch rider employed by United States Reclamation Service.

DISCHARGE MEASUREMENTS.—Made from upstream side of bridge at the gage.

CHANNEL AND CONTROL.—Channel is uniform in cross-section but slope varies with the stage. Control is a V-shaped concrete drop a mile below gage.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during the year, 254 second-feet.

REGULATION.—Flow is regulated at head gates, 26 miles above. A small reservoir at Spider Lake serves to equalize sudden changes at the head gates.

ACCURACY.—Stage-discharge relation practically permanent. Discharge computed by using a rating curve based on discharge measurements in 1918 and measurements of North Fork of Milk River at Peter's ranch, below outlet of the canal. Records fair.

COOPERATION.—In 1917 station was maintained by United States Reclamation Service.

Daily discharge, in second-feet, of United States Reclamation Service St. Mary canal at Hudson Bay divide, near Browning, Mont., 1917.

Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.
1	0	243	254	11	233	254	138	21	233	254	.....
2	0	254	254	12	223	254	146	22	233	254	.....
3	86	254	254	13	223	254	130	23	254	254	.....
4	91	254	254	14	223	254	0	24	254	254	.....
5	173	254	254	15	223	254	0	25	254	254	.....
6	203	254	223	16	223	254	.....	26	243	254	.....
7	203	254	233	17	223	254	.....	27	243	254	.....
8	203	254	233	18	223	254	.....	28	243	254	.....
9	223	254	233	19	223	254	.....	29	243	254	.....
10	223	254	193	20	228	254	.....	30	243	254	.....
								31	243	254	.....

NOTE: For method of computing daily discharge see "Accuracy" in station description.

Monthly discharge of United States Reclamation Service St. Mary canal at Hudson Bay divide, near Browning, Mont., 1917.

Month.	Discharge in second-feet.			Run-off.
	Maximum.	Minimum.	Mean.	Total in acre-feet.
July 3–31	254	86	218	12,500
August	254	243	254	15,600
September 1–13	254	130	215	5,540
The period	.....	.....	.....	33,600

FIDLER BROTHERS' DITCH AT BOUNDARY CREEK, ALTA.

LOCATION.—In the SE. ¼ sec. 19, T. 1, R. 26 W. fourth meridian, at Boundary Creek post office, 15 miles southwest of Cardston, Alta.

RECORDS AVAILABLE.—September 13, 1911 to July 13, 1914, and July 10 to 17, 1917.

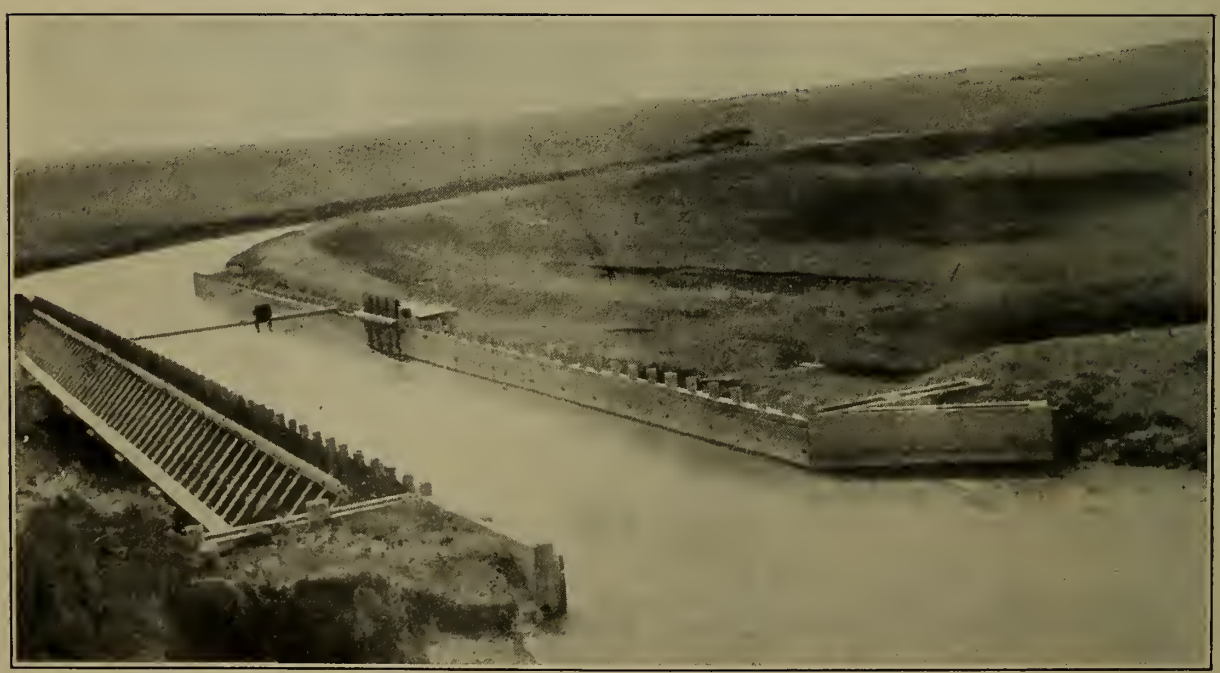
GAGE.—Vertical staff driven in bed of ditch; read by James Fidler.

DISCHARGE MEASUREMENTS.—Made near gage.

CHANNEL AND CONTROL.—Permanent.

Water diverted from July 10 to July 17, 1917. As no measurements were obtained it is impossible to systematize daily discharges. From the mean gage height, slope, and cross-section flow is estimated as 0.77 second-foot, or 12 acre-feet for period.

A. ALBERTA RAILWAY & IRRIGATION CO.'S CANAL. INTAKE AND DAM, KIMBALL, ALBERTA.



B. ALBERTA RAILWAY & IRRIGATION CO.'S CANAL. FLUME NO. 2, MAIN CANAL BELOW MAGRATH, ALBERTA.

Discharge measurements of Fidler Brothers' ditch at Boundary Creek, Alta., 1913 and 1914.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
1913.			
June 18	F. R. Burfield	1.33	2.55
1914.			
June 12	O. H. Hoover	1.51	2.6
July 2	do	1.46	2.5

Daily discharge, in second-feet, of Fidler Brothers' ditch at Boundary Creek, Alta., 1913–14.

Day.	June.	Day.	June.	July.
1913.		1914		
16	.....	1	.....	2.4
17	2.50	2	.....	2.5
18	2.50	3	2.6	2.5
19	1.80	4	2.6	2.5
20	2.50	5	2.6	2.5
21	2.50	6	2.6	2.6
22	1.80	7	2.6	2.5
23	1.80	8	2.5	2.5
24	1.80	9	2.5	2.4
25	2.50	10	2.5	2.4
26	2.50	11	2.5	2.4
27	.....	12	2.4	2.4
28	.....	13	2.9	2.4
29	.....	14	2.6	.....
30	.....	15	2.2	.....
31	.....			

Monthly discharge of Fidler Brothers' ditch at Boundary Creek, Alta., 1913–14.

Month.	Discharge in second-feet.			Run-off.
	Maximum.	Minimum.	Mean.	Total in acre-feet.
1913.				
June 17–26	2.50	1.80	2.22	44
The period	.....	.....	.....	44
1914.				
June 3–15	2.9	2.2	2.5	64
July 1–13	2.6	2.4	2.5	64
The period	.....	.....	.....	128

ALBERTA RAILWAY & IRRIGATION CO.'S CANAL AT KIMBALL, ALTA.

LOCATION.—In SE. ¼ sec. 36, T. 1, R. 25 W. fourth meridian, at the village of Kimball, 12 miles from railway station at Cardston, 200 yards below Alberta Railway & Irrigation Co.'s dam on St. Mary River. Station replaces one in the SE. ¼ sec. 21, T. 2, R. 24 W. fourth meridian, on the flume 6 miles down the canal from the head gates. (See Pl. VIII.)

RECORDS AVAILABLE.—During irrigation seasons, May 1, 1910, to October 21, 1917.

GAGE.—Inclined staff set in concrete lining of canal at control. Gage read daily by W. D. Willgrass to August 1; from that date by William Nicolls.

DISCHARGE MEASUREMENTS.—Made from suspension bridge.

CHANNEL AND CONTROL.—Bed and control composed of loose gravel, which is likely to shift. High gravel banks, lined with concrete for few feet at section.

EXTREMES OF DISCHARGE.—1910–1917: Maximum stage recorded, 53 inches at flume No. 1 June 20, 1910 (discharge, 858 second-feet); minimum stage recorded, 0.55 foot October 17, 1911 (discharge, 18 second-feet).

REGULATION.—Discharge controlled by head gates 500 feet above station.

ACCURACY.—Stage-discharge relation practically permanent at the concrete measuring section at present in use or at the former station at the flume. Slight change in control at present station probably due to shift of gravel below measuring station. Gage readings apparently too few for close determination of mean daily discharge. Records fair.

Discharge measurements of Alberta Railway & Irrigation Co.'s canal at Kimball, Alta., 1915–1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
May 6	V. A. Newhall	3.410	272	Aug. 15	S. H. Frame	3.15	252
11	do	3.440	276	Sept. 4	do	3.13	251
21	do	3.800	339	8	do	2.35	156
22	do	4.005	372	21	W. A. Burton	2.35	148
June 12	do	3.745	333	26	S. H. Frame	2.55	174
July 12	do	3.005	227	29	do	2.55	173
Aug. 3	do	2.800	208				
6	do	2.800	194	1917.			
17	do	2.800	196	May 3	A. W. P. Lowrie	1.50	77
1916.				7	do	1.81	104
Apr. 25	S. H. Frame	1.92	113	25	do	2.10	136
May 30	do	2.10	129	June 19	do	3.50	311
June 20	do	2.87	225	July 9	do	4.20	414
23	do	2.91	218	26	do	4.40	452
26	do	3.13	254	Aug. 24	do	4.10	378
July 5	do	3.16	254	Sept. 18	do	3.25	240
11	do	3.15	256	Oct. 17	do	3.00	[a]219
26	do	3.14	250				

[a] Determination likely to be in error owing to heavy snow storm at time of measurement.

Daily discharge, in second-feet, of Alberta Railway & Irrigation Co.'s canal at Kimball, Alta, 1915–1917.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1915.							
1		224	368	223	209	198	251
2		221	370	221	197	199	256
3		247	360	248	199	201	255
4		248	356	247	199	199	256
5		273	352	234	198	198	224
6		275	354	222	199	199	199
7		276	354	222	199	199	199
8		276	356	221	199	245	199
9		276	357	222	199	276	
10		275	341	221	199	275	
11		283	332	222	199	273	
12		275	328	221	198	273	
13		336	325	222	199	273	
14		336	332	222	199	255	
15		338	332	221	199	255	
16		335	332	221	199	255	
17		336	328	224	199	254	
18		336	328	221	198	254	
19		332	322	222	200	255	
20		335	314	220	199	255	
21		336	312	221	198	254	
22		367	312	222	199	251	
23		368	314	222	199	251	
24		370	298	222	199	256	
25		367	118	222	199	254	
26		367	222	222	199	251	
27	58	370	223	222	199	254	
28	177	367	221	220	199	254	
29	167	370	222	210	199	255	
30	167	367	220	199	199	254	
31		370		210	199		

Daily discharge, in second-feet, of Alberta Railway & Irrigation Co.'s canal at Kimball, Alta.—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1916.							
1	.....	147	128	252	255	255	174
2	.....	163	127	254	254	254	174
3	.....	179	128	255	254	255	174
4	.....	179	133	255	254	251	174
5	.....	178	138	255	254	152	147
6	.....	179	137	255	254	116	124
7	.....	181	138	252	254	152	124
8	.....	179	142	254	252	152	.....
9	.....	192	158	254	255	152	.....
10	.....	190	157	254	254	152	.....
11	.....	192	158	254	254	152	.....
12	.....	192	157	252	254	152	.....
13	.....	193	158	254	252	153	.....
14	.....	192	157	254	254	151	.....
15	.....	217	157	254	254	152	.....
16	.....	246	194	254	254	152	.....
17	.....	261	205	255	255	152	.....
18	.....	276	218	254	254	152	.....
19	.....	307	217	254	252	152	.....
20	.....	333	214	254	254	152	.....
21	.....	356	225	252	252	152	.....
22	.....	357	231	255	255	179	.....
23	.....	257	220	252	254	211	.....
24	.....	356	229	254	254	211	.....
25	114	211	255	252	254	192	.....
26	.....	112	251	252	254	174	.....
27	.....	112	252	255	255	174	.....
28	86	120	252	254	252	174	.....
29	122	129	254	252	254	174	.....
30	133	128	252	254	254	174	.....
31	.....	129	.....	252	252	.....	.....
1917.							
1	.....	77	168	418	450	276	238
2	.....	78	168	418	450	241	238
3	.....	77	168	418	450	229	239
4	.....	90	168	418	450	215	239
5	.....	104	185	418	450	221	239
6	.....	104	203	418	450	203	240
7	.....	105	215	418	434	184	234
8	.....	105	228	418	450	172	234
9	.....	105	246	418	450	208	229
10	.....	104	266	418	450	303	229
11	.....	104	168	418	450	263	222
12	.....	104	130	418	434	225	223
13	.....	104	228	402	402	223	217
14	.....	135	246	386	402	223	217
15	.....	135	266	386	402	222	219
16	.....	135	287	386	397	222	219
17	.....	135	309	386	394	234	219
18	.....	135	309	386	391	234	213
19	.....	135	309	386	391	234	207
20	.....	135	309	386	400	234	207
21	.....	135	309	386	402	234	201
22	.....	135	309	434	394	234	.....
23	.....	135	309	450	386	235	.....
24	.....	135	324	450	378	235	.....
25	.....	135	339	450	378	235	.....
26	57	135	370	450	376	235	.....
27	64	135	370	450	376	236	.....
28	53	135	418	450	359	236	.....
29	65	135	418	450	320	236	.....
30	77	135	418	450	286	238	.....
31	.....	142	.....	450	297	.....	.....

NOTE.—1915: Head gates opened Apr. 27 and closed Oct. 9.
1916: Head gates opened Apr. 25 and Apr. 28 to Oct. 7.
1917: Head gates opened Apr. 26 and closed Oct. 21.
Shifting control Aug. 22 to Oct. 21. Determinations of discharge for October believed to be a few second-feet too high, owing to insufficient gage-height observations.

Monthly discharge of Alberta Railway & Irrigation Co.'s canal at Kimball, Alta., 1915–1917.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1915.				
April 27–30	177	58	142	1,126
May	370	221	318	19,553
June	370	118	310	18,446
July	248	199	222	13,650
August	209	197	199	12,236
September	276	198	244	14,519
October 1–9	256	199	230	3,649
The period				83,179
1916.				
April 25–30	133	86	114	904
May	357	112	211	12,974
June	255	127	188	11,187
July	255	252	254	15,618
August	255	252	254	15,618
September	255	116	174	10,354
October 1–7	174	124	156	2,166
The period				68,821
1917.				
April 26–30	77	53	63	625
May	142	77	119	7,317
June	418	168	272	16,185
July	450	386	419	25,763
August	450	286	403	24,780
September	303	172	231	13,745
October 1–21	240	201	225	9,372
The period				97,787

Mean monthly discharge, in second-feet, of Alberta Railway & Irrigation Co.'s canal at Kimball, Alta., 1910–1917.

Year.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Total in acre-feet.
1910	0	289	628	571	472	414	*a* 50	146,909
1911	*a* 41	269	382	376	387	273	*a* 213	117,950
1912	0	260	500	330	298	309	*a* 9	103,295
1913	0	262	526	351	381	340	*a* 95	118,468
1914	*a* 19	454	696	666	542	368	*a* 64	170,538
1915	*a* 19	318	310	222	199	244	*a* 59	83,412
1916	*a* 15	211	188	254	254	174	*a* 35	68,821
1917	*a* 11	119	272	419	403	231	*a* 152	97,787
Average	13	273	438	399	367	294	85	113,409
Average run-off, acre-feet	774	16,786	26,063	24,534	22,566	17,494	5,226	113,443

a Reduced to monthly average.

NOTE.—Records 1910 to 1914, inclusive, were taken at station near Kimball; those for 1915–1917 at Kimball.

ALBERTA RAILWAY & IRRIGATION CO.'S CANAL NEAR KIMBALL, ALTA.

LOCATION.—In SE. ¼ sec. 21, T. 2, R. 24 W. fourth meridian, 6 miles northeast of Kimball post office, 4 miles south of Woolford railway station, 6 miles down the canal from head gates at Kimball. Gage midway along 700-foot flume which crosses Rolph Creek.

RECORDS AVAILABLE.—Irrigation seasons, May 1, 1910, to October 7, 1916. Records previous to 1915 were taken at old flume just north of present structure.

GAGE.—Vertical staff bolted to left wall of flume; zero of gage level with bottom of flume. Gage read by J. M. Dunn.

DISCHARGE MEASUREMENTS.—Made from foot bridge spanning flume about midway from the ends and built for the purpose.

CHANNEL AND CONTROL.—Rectangular flume 27 feet wide with 6-foot walls.

ACCURACY.—Owing to the discharge being in an artificial channel the discharge measurements are considered accurate and the records good.

This station was abandoned in favor of a more convenient site near the head gates at an artificial gaging section. (See description, pages 125–128.)

Discharge measurements of Alberta Railway & Irrigation Co.'s canal near Kimball, Alta., 1910–1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1910.		*Feet.*	*Sec.-ft.*	1913.		*Feet.*	*Sec.-ft.*
May 7	L. J. Gleeson	.....	172	June 6	F. R. Burfield	2.88	469
9	do	.....	274	6	do	2.88	459
June 20	F. H. Peters	.....	855	12	W. A. Burton	3.20	571
July 26	do	3.0	474	28	F. R. Burfield	2.74	429
Aug. 8	do	.....	542	July 9	W. A. Burton	2.53	367
8	do	3.2	535	22	F. R. Burfield	2.47	360
Sept. 8	N. M. Sutherland	2.7	431	Aug. 8	do	2.50	360
21	do	3.1	523	27	do	2.99	474
Oct. 3	do	2.1	301	Sept. 20	L. Danielsen	2.43	322
4	do	1.9	244				
5	do	1.2	114	1914.			
6	do	.8	68	May 14	O. H. Hoover	2.92	502
				June 3	do	3.62	666
1911.				23	do	3.83	736
Apr. 29	L. J. Gleeson	2.00	246.30	27	do	3.75	705
May 17	do	2.35	337.00	July 16	do	3.69	672
June 2	do	2.75	450.81	16	do	3.69	672
21	do	3.33	578.95	22	do	3.61	644
July 13	do	2.95	462.70	Aug. 12	do	3.18	521
21	do	3.00	472.67	14	do	3.10	507
21	do	3.00	495.02	27	do	3.16	520
Aug. 5	do	3.11	499.61	Sept. 2	do	3.02	483
17	do	2.63	387.00	9	do	2.67	394
30	do	2.25	296.70	17	do	2.64	378
Oct. 10	do	2.87	417.19	20	do	1.31	107
14	do	2.24	272.03	20	do	.93	59
15	do	1.43	125.43	20	do	.75	38
16	do	1.10	67.81	21	do	2.10	250
16	do	1.10	72.29	21	do	2.36	313
17	do	.55	18.20	Oct. 1	do	2.56	365
1912.				1915.			
May 6	L. J. Gleeson	1.76	188.7	May 6	V. A. Newhall	2.830	274
29	do	2.66	384.1	11	do	2.830	280
June 4	do	2.96	460.0	June 12	do	3.135	336
18	do	3.11	499.7	18	do	3.110	329
24	do	3.19	524.9	July 13	do	2.540	221
July 4	do	3.05	490.6	15	do	2.540	223
17	V. Meek	2.10	256.1	Aug. 4	do	2.400	198
24	do	2.12	264.8	19	G. H. Whyte	2.405	196
Aug. 10	do	2.32	308.8	Sept. 1	V. A. Newhall	2.405	194
24	do	2.32	319.8	Oct. 2	do	2.740	253
31	do	2.32	307.9				
Sept. 17	do	2.35	314.3	1916.			
Oct. 1	do	1.88	218.2	June 2	S. H. Frame	1.95	123
2	G. F. Deas	1.08	87.05	24	do	2.53	219
				July 27	do	2.67	248
1913.				Aug. 17	do	2.70	249
Apr. 30	F. R. Burfield	1.32	100	Sept. 5	do	2.70	244
May 15	do	2.07	256	27	do	2.26	173

Daily discharge, in second-feet, of Alberta Railway & Irrigation Co.'s canal near Kimball, Alta., 1910–1916.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1910.							1910.						
1	155	398	660	576	323	417	16	219	682	576	515	455	.....
2	155	398	660	576	341	417	17	253	660	576	495	515	.....
3	155	398	660	555	341	305	18	323	682	576	495	495	.....
4	155	398	660	535	341	236	19	360	682	576	475	495	.....
5	155	495	638	535	360	114	20	379	858	576	455	305	.....
6	155	495	638	515	360	68	21	379	660	555	455	515	.....
7	155	597	618	515	398	.....	22	379	660	535	436	515	.....
8	219	618	618	535	417	.....	23	379	682	535	417	515	.....
9	270	660	618	515	417	.....	24	379	682	515	436	495	.....
10	270	748	597	515	417	.....	25	398	660	495	417	417	.....
11	270	770	597	515	417	.....	26	398	660	495	379	379	.....
12	270	638	597	515	417	.....	27	398	638	495	360	379	.....
13	253	660	576	515	417	.....	28	398	660	495	360	379	.....
14	270	660	576	515	398	.....	29	398	682	475	341	379	.....
15	219	682	576	515	417	.....	30	398	682	475	323	398	.....
							31	398	.....	475	323	.....	.....

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1911.							
1	.....	25	333	.....	497	a 348	a 484
2	.....	25	410	.....	484	374	a 484
3	.....	67	410	.....	484	a 331	484
4	.....	254	447	.....	502	a 289	a 484
5	.....	273	a 427	.....	502	248	a 484
6	.....	292	410	.....	a 444	.....	a 484
7	.....	254	a 410	560	386	.....	484
8	.....	254	410	560	a 386	.....	a 484
9	.....	254	a 432	a 280	386	.....	484
10	.....	254	454	248	386	.....	434
11	.....	254	a 462	422	a 379	63	a 434
12	.....	254	472	447	374	a 111	434
13	.....	254	a 452	460	a 374	a 170	a 360
14	.....	254	434	472	a 374	a 233	287
15	.....	273	a 452	497	374	303	125
16	.....	a 294	472	a 500	a 379	303	69
17	.....	314	a 472	502	381	a 331	18
18	.....	314	472	a 500	381	362	a 22
19	.....	314	472	497	381	a 367	28
20	.....	a 324	a 271	a 484	a 381	a 374	28
21	.....	333	555	472	381	a 379	.....
22	.....	a 326	581	472	a 381	386	.....
23	.....	a 319	581	a 467	a 381	386	.....
24	.....	314	581	460	381	a 379	.....
25	138	a 314	581	472	a 362	374	.....
26	138	a 314	.....	a 477	a 343	a 374	.....
27	237	314	.....	484	a 324	a 374	.....
28	237	a 319	.....	a 477	303	374	.....
29	237	a 326	.....	472	a 298	484	.....
30	237	333	.....	a 484	292	484	.....
31	.....	333	.....	497	a 319	.....	.....

a Interpolated.

Daily discharge, in second-feet, of Alberta Railway & Irrigation Co.'s canal near Kimball, Alta., 1910–1916—Continued.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1912.							1912.						
1	92	472	517	258	305	212	16	303	514	258	305	314	.....
2	166	472	502	258	308	67	17	303	510	258	308	314	.....
3	186	467	502	258	308	.....	18	303	502	258	308	314	.....
4	196	462	484	258	308	.....	19	303	522	258	308	314	.....
5	196	462	484	262	308	.....	20	303	522	258	308	314	.....
6	188	462	484	262	308	.....	21	303	520	260	305	314	.....
7	190	462	490	308	308	.....	22	303	520	262	310	312	.....
8	190	462	480	308	314	.....	23	294	514	260	312	305	.....
9	186	464	472	308	314	.....	24	298	522	258	308	308	.....
10	186	472	374	308	314	.....	25	301	522	258	308	310	.....
11	190	512	280	303	314	.....	26	350	522	258	308	305	.....
12	190	517	258	308	314	.....	27	348	522	254	308	303	.....
13	196	517	258	308	314	.....	28	248	522	250	308	298	.....
14	192	517	258	308	314	.....	29	388	522	258	308	292	.....
15	196	517	248	305	314	.....	30	410	520	258	308	292	.....
							31	452	.....	258	305	.....	.....

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Date.	May.	June.	July.	Aug.	Sept.	Oct.
1913.							1913.						
1	106	428	372	345	364	325	16	252	620	320	359	345	.....
2	126	458	372	350	364	350	17	256	682	333	355	340	.....
3	136	458	372	366	361	407	18	262	613	333	352	338	.....
4	136	461	372	372	364	389	19	256	603	333	352	340	.....
5	136	467	372	377	364	369	20	252	613	338	352	340	.....
6	156	505	372	372	364	350	21	254	613	345	352	340	.....
7	252	521	372	366	364	350	22	256	603	350	352	335	.....
8	252	521	369	359	364	333	23	262	603	345	352	333	.....
9	252	521	366	359	364	58	24	258	521	345	352	320	.....
10	308	521	366	359	364	.....	25	252	505	345	489	303	.....
11	372	521	377	359	364	.....	26	252	474	350	501	301	.....
12	400	571	352	359	308	.....	27	252	458	350	501	297	.....
13	372	577	335	359	352	.....	28	252	425	350	505	294	.....
14	252	577	320	359	348	.....	29	359	400	350	505	311	.....
15	252	571	320	359	345	.....	30	442	372	348	361	320	.....
							31	483	.....	348	361	.....	.....

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1914.							
1	.....	283	627	678	609	475	346
2	.....	288	627	684	609	478	346
3	.....	365	658	684	606	481	346
4	.....	370	700	684	606	478	382
5	.....	370	700	684	596	475	276
6	.....	365	700	678	596	408	276
7	.....	395	697	684	596	382	.....
8	.....	408	691	684	584	382	.....
9	.....	411	697	684	566	390	.....
10	.....	413	704	684	556	382	.....
11	.....	413	700	681	545	358	.....
12	.....	413	700	681	525	346	.....
13	.....	448	697	684	517	346	.....
14	.....	453	700	681	509	334	.....
15	.....	451	700	684	497	322	.....
16	.....	456	700	681	489	327	.....
17	.....	456	700	684	575	358	.....
18	.....	456	700	681	462	356	.....
19	.....	451	700	681	497	358	.....
20	.....	448	700	684	497	122	.....
21	.....	509	714	684	520	360	.....
22	.....	475	717	655	545	346	.....
23	.....	509	727	649	545	346	.....
24	.....	531	717	649	545	346	.....
25	.....	531	724	646	517	346	.....
26	.....	531	700	643	517	346	.....
27	.....	531	700	627	517	346	.....
28	.....	528	700	615	517	346	.....
29	283	606	700	612	517	346	.....
30	283	590	684	612	517	346	.....
31	.....	615	.....	609	517	.....	.....

Daily discharge, in second-feet, of Alberta Railway & Irrigation Co.'s canal near Kimball, Alta., 1910–1916—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1915.							
1	.....	222	372	226	195	195	250
2	.....	222	372	222	191	195	250
3	.....	246	370	250	191	195	254
4	.....	274	360	246	195	193	254
5	.....	276	350	246	195	195	252
6	.....	274	350	220	195	195	195
7	.....	274	350	220	195	231	195
8	.....	274	350	220	195	276	195
9	.....	272	350	220	195	276	.....
10	.....	274	350	220	195	276	.....
11	.....	276	334	220	195	274	.....
12	.....	342	336	220	195	274	.....
13	.....	340	334	220	195	274	.....
14	.....	340	336	220	195	254	.....
15	.....	340	336	220	195	250	.....
16	.....	336	336	220	195	250	.....
17	.....	338	334	220	195	250	.....
18	.....	340	338	220	195	250	.....
19	.....	340	326	220	195	250	.....
20	.....	340	318	220	195	250	.....
21	.....	340	320	222	195	250	.....
22	.....	374	318	220	195	250	.....
23	.....	372	318	220	195	250	.....
24	.....	372	318	220	195	250	.....
25	.....	372	282	222	195	250	.....
26	.....	372	48	220	195	250	.....
27	160	370	222	220	195	250	.....
28	152	372	217	217	195	250	.....
29	152	372	218	220	195	250	.....
30	152	372	204	204	195	250	.....
31	.....	372	.....	199	195	.....	.....
1916.							
1	.....	149	123	246	244	244	a 172
2	.....	146	123	249	244	246	172
3	.....	174	123	249	244	a 248	172
4	.....	175	123	242	244	249	172
5	.....	175	137	246	244	249	174
6	.....	175	130	246	a 244	79	119
7	.....	175	130	246	244	146	119
8	.....	179	138	249	242	149	.....
9	.....	187	162	246	244	149	.....
10	.....	187	156	246	244	a 149	.....
11	.....	187	154	246	244	149	.....
12	.....	187	154	246	244	146	.....
13	.....	187	154	246	244	149	.....
14	.....	187	154	244	244	149	.....
15	.....	240	154	246	244	149	.....
16	.....	231	179	246	246	149	.....
17	.....	231	192	246	249	a 149	.....
18	.....	259	213	246	246	149	.....
19	.....	295	213	244	244	149	.....
20	.....	295	213	246	244	149	.....
21	.....	340	196	246	244	149	.....
22	.....	340	222	246	244	213	.....
23	.....	340	213	246	244	213	.....
24	.....	340	218	244	244	a 213	.....
25	.....	a 221	231	246	244	213	.....
26	.....	102	242	246	244	162	.....
27	.....	102	242	244	244	172	.....
28	68	123	246	244	244	172	.....
29	135	123	246	244	244	172	.....
30	116	123	240	244	244	172	.....
31	.....	123	.....	244	246	.....	.....

a Estimated.

NOTE.—1911: Head gates open Apr. 24 to June 25, July 7 to Sept. 5, and Sept. 11 to Oct. 20.
1912: Head gates closed Oct. 3.
1913: No gage readings prior to May 1. Head gates closed Oct. 10.
1914: Head gates open Apr. 29 to Oct. 6.
1915: Head gates opened Apr. 27 and closed Oct. 9.
1916: Head gates opened Apr. 28 and closed Oct. 7.

Monthly discharge of Alberta Railway & Irrigation Co.'s canal near Kimball, Alta., 1910–1916.

Month.	Discharge in second-feet.			Total discharge in acre-feet.
	Maximum.	Minimum.	Mean.	
1910.				
May	398	155	289	17,776
June	858	398	628	37,369
July	660	475	571	35,109
August	576	323	472	29,022
September	515	305	414	24,635
October 1–6	417	68	260	3,088
The period				146,999
1911.				
April 25–30	237	138	204	2,428
May	333	25	269	16,540
June 1–25	581	271	382	22,731
July 7–31	560	248	376	23,119
August	502	292	387	23,796
September 1–5, 11–30	484	63	273	16,245
October 1–20	484	18	330	13,091
The period				117,950
1912.				
May	452	92	260	15,987
June	522	462	660	29,752
July	517	248	330	20,291
August	312	258	298	18,323
September	314	292	309	18,387
October 1 and 2	212	67	140	555
The period				103,295
1913.				
May	483	106	262	16,110
June	682	372	526	31,300
July	377	320	351	21,580
August	505	345	381	23,428
September	364	294	340	20,230
October 1–9	407	58	326	5,820
The period				118,468
1914.				
Apr. 29–30	283	283	283	1,122
May	615	283	454	27,915
June	727	627	696	41,415
July	684	609	666	40,951
August	609	462	542	33,326
September	481	122	368	21,898
October 1–6	382	276	329	3,911
The period				170,538
1915.				
April 27–30	160	152	154	1,222
May	374	222	323	19,860
June	372	48	312	18,565
July	250	199	222	13,650
August	195	191	195	11,990
September	276	193	243	14,460
October 1–8	256	195	231	3,665
The period				83,412
1916.				
April 28–30	135	68	106	631
May	340	102	203	12,482
June	216	123	181	10,770
July	249	242	246	15,126
August	249	242	244	15,003
September	249	79	175	10,413
October 1–7	174	119	157	2,179
The period				66,604

ALBERTA RAILWAY & IRRIGATION CO.'S CANAL AT SPRING COULEE, ALTA.

LOCATION.—In the NW. ¼ sec. 28, T. 4, R. 23 W., fourth meridian, at Spring Coulee, about half a mile east of the railway station. (See Pl. IX.)

RECORDS AVAILABLE.—Irrigation seasons May 1, 1914, to October 19, 1917.

GAGE.—Vertical staff set in bed of canal near left bank; read by F. H. Kelley.

DISCHARGE MEASUREMENTS.—Made from a cable 150 feet above gage.

CHANNEL AND CONTROL.—Bed composed of sand, clay, and small stones. High clay banks; not subject to overflow, but likely to cave in and change control during and after high stages.

EXTREMES OF DISCHARGE.—1914–1917: Maximum stage recorded, 4.75 feet, July 1, 1914 (discharge, 638 second-feet); minimum stage recorded, 2.09 feet, July 4, 6, and 7, 1916 (discharge, 36 second-feet).

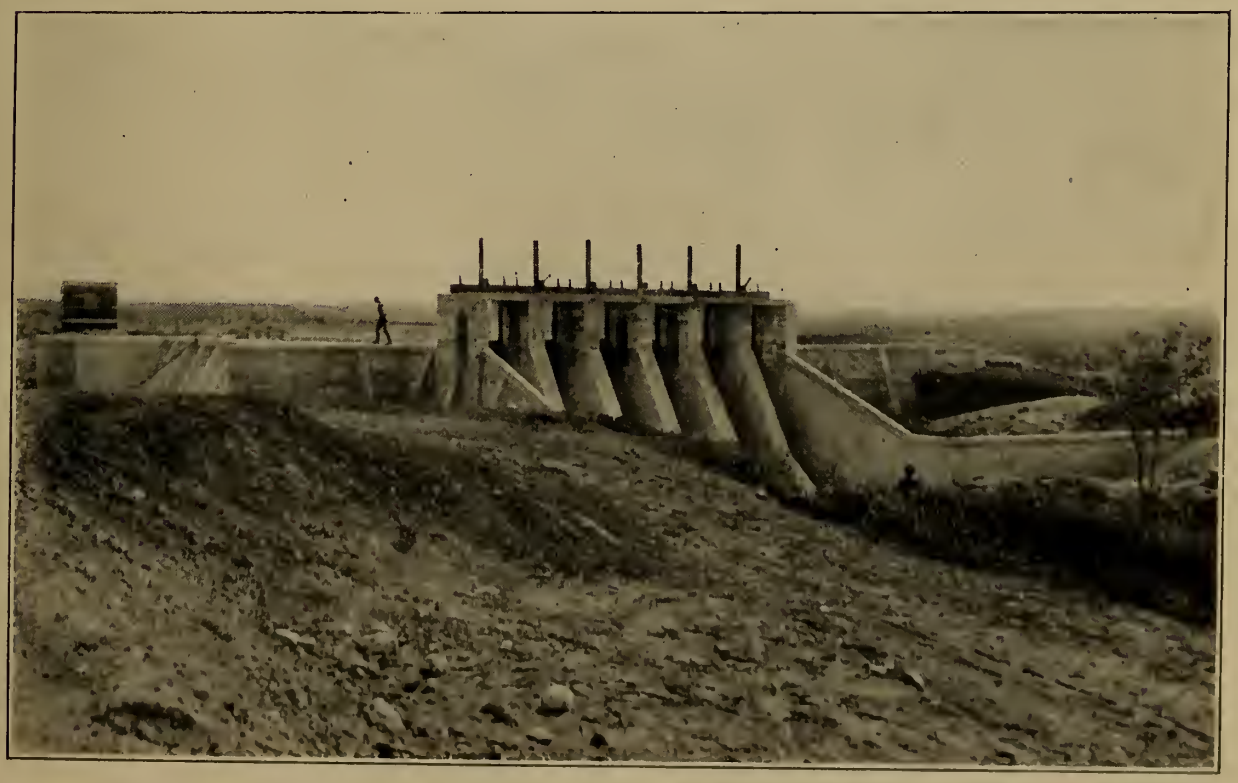
REGULATION.—Flow controlled by head gates at Kimball and by waste gates, by which water can be emptied into Pinepound creek, about a mile above gage at Spring Coulee.

ACCURACY.—Stage-discharge relation not permanent; affected by shifting of bed and caving banks. Gage read to hundredths daily. A few inaccuracies in observations appear to have occurred during 1917. Daily discharge determined by applying daily gage heights to rating table, and by shifting-control method. Records fair.

Discharge measurements of Alberta Railway & Irrigation Co.'s canal at Spring Coulee, Alta., 1914–1917.

Date.	Made by—	Gauge height.	Discharge.	Date.	Made by—	Gauge height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
May 1	O. H. Hoover	2.92	197	Apr. 14	S. H. Frame	1.33	Nil.
20	W. A. Burton	3.77	405	May 9	do	3.09	175
July 14	O. H. Hoover	4.69	623	27	do	3.25	216
24	do	4.66	615	July 17	W. A. Burton	3.35	242
Aug. 7	do	4.42	548	Aug. 21	S. H. Frame	3.31	246
15	do	4.15	487	Sept. 18	W. A. Burton	2.89	149
28	do	4.20	511	Oct. 9	S. H. Frame	1.95	21
Sept. 16	do	3.47	296				
24	do	3.65	368	1917.			
Oct. 2	do	3.72	357	May 11	W. A. Burton	2.72	121
				June 6	A. W. P. Lowrie	3.19	222
1915.				29	do	4.04	401
May 17	V. A. Newhall	3.93	360	July 16	W. A. Burton	3.92	382
June 4	W. A. Burton	3.92	359	Aug. 3	A. W. P. Lowrie	4.12	443
24	V. A. Newhall	3.62	318	15	do	3.89	368
July 9	do	3.22	221	Sept. 13	do	3.29	216
31	do	2.94	176	27	do	3.33	218
Sept. 7	do	3.08	192				
28	W. A. Burton	3.32	262				

A. ALBERTA RAILWAY & IRRIGATION CO.'S CANAL. HEAD GATES ON SPRING COULEE.



B. ALBERTA RAILWAY & IRRIGATION CO.'S CANAL. WASTE GATES.

Daily discharge, in second-feet, of Alberta Railway & Irrigation Co.'s canal at Spring Coulee, Alta., 1914–1917.

Day.	May.	June.	July.	Aug.	Day.	May.	June.	July.	Aug.
1914.					1914.				
1	196	469	638	518	16	420	633	633	485
2	207	474	633	526	17	426	628	622	495
3	292	495	635	a 531	18	426	625	628	477
4	321	526	635	a 537	19	426	622	625	477
5	430	542	630	a 542	20	433	630	628	487
6	319	599	633	a 547	21	430	628	630	482
7	394	604	635	552	22	420	622	630	490
8	423	609	633	a 531	23	430	630	628	469
9	420	625	628	a 511	24	438	630	615	474
10	411	607	622	490	25	436	625	617	466
11	416	622	625	479	26	433	628	625	472
12	411	620	635	485	27	438	625	604	474
13	420	622	633	485	28	438	630	620	479
14	416	617	630	490	29	448	633	581	461
15	423	628	633	482	30	456	635	576	469
					31	464	.....	555	466

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1915.							1915.						
1	233	349	216	168	190	264	16	347	336	219	195	238	.....
2	247	354	240	160	187	258	17	362	323	224	189	220	.....
3	246	355	256	198	210	263	18	360	327	229	190	256	.....
4	267	360	248	187	211	264	19	347	325	222	192	252	.....
5	293	371	244	189	203	269	20	338	323	222	194	248	.....
6	291	363	242	197	198	266	21	335	317	221	203	250	.....
7	290	359	225	194	197	263	22	360	309	219	195	249	.....
8	291	360	224	192	200	264	23	357	307	218	192	249	.....
9	293	341	220	195	198	227	24	352	312	221	194	256	.....
10	290	339	221	198	199	211	25	350	290	219	190	254	.....
11	291	317	216	194	204	205	26	349	360	224	189	250	.....
12	290	331	218	198	206	.....	27	347	a .88	222	186	249	.....
13	291	323	216	203	208	.....	28	346	225	365	187	264	.....
14	303	328	222	197	240	.....	29	352	217	216	190	261	.....
15	320	333	218	194	240	.....	30	347	214	192	192	263	.....
							31	331	.....	174	194	.....	.....

a Interpolated.

Daily discharge, in second-feet, of Alberta Railway & Irrigation Co.'s canal at Spring Coulee, Alta., 1914–1917—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1916.							
1	.....	159	174	239	248	237	145.00
2	.....	161	174	244	248	235	143.00
3	.....	171	170	166	250	299	154.00
4	.....	167	36	166	248	299	160.00
5	.....	171	37	166	248	286	156.00
6	.....	167	36	224	248	[a] 209	148.00
7	.....	170	36	224	248	132	130.00
8	.....	167	170	224	248	141	122.00
9	.....	175	170	224	248	141	21.00
10	.....	177	191	226	250	141	22.00
11	.....	179	204	220	248	141	6.40
12	.....	180	200	226	248	141	0
13	.....	182	200	224	250	141	0
14	.....	186	182	222	248	141	0
15	.....	203	187	222	250	141	0
16	.....	239	213	220	253	141	0
17	.....	243	226	246	253	141	0
18	.....	248	224	248	250	148	0.80
19	.....	251	224	248	248	148	0.80
20	.....	256	180	248	235	148	1.60
21	.....	263	191	246	237	146	1.60
22	.....	270	195	244	235	145	2.40
23	.....	320	235	246	237	145	2.40
24	.....	386	235	246	237	148	1.60
25	.....	365	233	248	237	172	1.60
26	.....	228	235	246	235	178	0.80
27	.....	224	235	248	237	180	0
28	.....	217	239	246	235	180	0
29	107	222	239	246	237	178	0
30	116	224	242	248	237	178	0
31	.....	170	.....	248	237	.....	0
1917.							
1	.....	.....	186	338	446	[a] 286	235
2	.....	124	190	446	487	195	235
3	.....	121	184	452	437	199	247
4	.....	109	188	471	437	199	177
5	.....	119	192	463	437	195	259
6	.....	125	223	452	437	195	235
7	.....	125	227	446	446	199	235
8	.....	125	233	446	461	190	235
9	.....	123	231	446	431	186	225
10	.....	121	284	401	461	197	215
11	.....	121	383	527	446	195	215
12	.....	121	201	527	446	205	215
13	.....	122	219	527	401	215	215
14	.....	129	223	371	401	225	177
15	.....	146	223	371	368	215	177
16	.....	147	225	377	428	215	177
17	.....	148	249	371	434	207	177
18	.....	152	300	377	428	201	177
19	.....	149	297	386	398	195	160
20	.....	160	287	410	383	195	.....
21	.....	160	292	401	383	195	.....
22	.....	164	287	527	383	195	.....
23	.....	160	284	493	383	205	.....
24	.....	180	290	493	383	235	.....
25	.....	165	316	483	368	221	.....
26	.....	180	319	477	368	215	.....
27	.....	176	290	416	398	223	.....
28	.....	183	310	443	374	235	.....
29	.....	199	413	446	368	235	.....
30	.....	192	362	446	377	235	.....
31	.....	172	.....	446	[a] 371	.....	.....

[a] Estimated.

NOTE.—1915: Shifting control June 24 to July 9 and Sept. 7–28. Water below zero gage from Oct. 12–31.

1916: Shifting control May 10–26.

1917: Head gates were opened Apr. 26 and closed Oct. 21. Control shifting May 30 to June 9. Results for July believed to be about 30 second-feet too high, owing to erroneous gage-height observations.

Monthly discharge of Alberta Railway & Irrigation Co.'s canal at Spring Coulee, Alta., 1914–1917.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
1914.				
May	464	196	402	24,718
June	635	469	603	35,881
July	638	555	622	38,245
August	552	461	494	30,375
September	.....	.....	[a] 330	19,636
October 1–6	.....	.....	[a] 300	3,569
The period	.....	.....	.....	152,424
1915.				
April 28–30	.....	.....	.....	.....
May	362	233	317	19,467
June	363	88	315	18,756
July	365	174	227	13,952
August	203	160	192	11,775
September	264	187	228	13,585
October 1–12	269	205	250	5,460
The period	.....	.....	.....	82,995
1916.				
April 29–30	116	107	112	444
May	386	159	217	13,343
June	242	36	184	10,949
July	248	166	230	14,142
August	253	235	244	15,003
September	299	132	173	10,294
October	160	0	39	2,398
The period	.....	.....	.....	66,573
1917.				
May 2–31	199	109	147	8,747
June	413	184	264	15,709
July [b]	527	338	441	27,116
August	461	368	410	25,210
September	286	186	210	12,496
October	259	160	210	7,914
The period	.....	.....	.....	97,192

[a] Discharge estimated from records of flow at Kimball.
[b] Discharge recorded for July, 1917, believed to be about 30 second-feet too high owing to erroneous gage-height observations.

Mean monthly discharge, in second-feet, of Alberta Railway & Irrigation Co.'s canal at Spring Coulee, Alta., 1914–1917.

Year.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Total.
								Acre-ft.
1914	.....	402	603	622	494	[a] 300	[a] 300	[a] 152,424
1915	.....	317	315	227	192	228	[b] 89	82,995
1916	[b] 7	217	184	230	244	173	39	66,573
1917	.....	[b] 143	264	441	410	210	[b] 129	97,195
Average	7	270	342	380	335	228	139	99,796
Average run-off, acre-feet	417	16,601	20,350	23,365	20,598	13,567	8,547	103,445

[a] Estimated. [b] Reduced to monthly average.

MISCELLANEOUS MEASUREMENTS.

The results of discharge measurements of streams and canals in the St. Mary River basin at points other than those at which gaging stations have been maintained are presented in the following table:

Miscellaneous measurements in St. Mary River drainage basin, 1900–1917.

Made by United States engineers.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
1900.					
June 18	St. Mary River	Belly River	Babb, Mont		2,290
Aug. 6	do	do	do		750
Oct. 14	do	do	do		552
June 16	do	do	Outlet of lower lake		750
1901.					
Oct. 9	Swiftcurrent Creek	St. Mary River	Babb, Mont		188
30	do	do	do		123
Nov. 5	Kennedy Creek	do	do		55
1903.					
May 10	St. Mary River	Belly River	Babb, Mont	1.60	918
10	do	do	do		953
uly 18	Boulder Creek	Swiftcurrent Creek	50 yards above mouth near Babb, Mont.	1.50	140
Aug. 3	Boundary Creek	St. Mary River	¼ mile above mouth, near international boundary.	.70	29
Oct. 5	do	do	do	.57	18
Aug. 3	Alberta Railway & Irrigation Co.'s canal.	From St. Mary River.	Kimball, Alta		111
1904.					
July 12	Alberta Railway & Irrigation Co.'s canal.	From St. Mary River.	Kimball, Alta		167
July 30	do	do	do		161
1905.					
July 20	St. Mary River	Belly River	Babb, Mont	2.30	1,316
Sept. 23	do	do	do	.87	317
24	do	do	Just above mouth of Kennedy Creek, Babb, Mont.		343
24	do	do	5½ miles below Kennedy Creek, Babb, Mont.		349
24	do	do	Paisley dam site, Babb, Mont.		381
25	do	do	¼ mile above International Line, Mont.		332
July 22	do	do	Kimball, Alta.[a]	3.35	1,408
Sept. 26	do	do	do [b]		105
23	Kennedy Creek	St. Mary River	At mouth, near Babb, Mont.		22
July 22	Alberta Railway & Irrigation Co.'s canal.	From St. Mary River.	Kimball, Alta,[c]		289
22	do	do	do [d]		311
Sept. 25	do	do	do [e]		278
1908.					
July 28	Alberta Railway & Irrigation Co.'s canal.	From St. Mary River.	Kimball, Alta		323
1910.					
Nov. 20	St. Mary River	Belly River	Kimball, Alta	3.12	681
1911.					
Dec. 6	Swiftcurrent Creek	St. Mary River	Outlet of McDermott Lake Many Glacier, Mont.		19.1
1912.					
Mar. 19	Swiftcurrent Creek	St. Mary River	Outlet of McDermott Lake Many Glacier. Mont.		10.8
1913.					
Aug. 21	Boulder Creek	Swiftcurrent Creek	Mouth, near Babb, Mont		36

[a] Measured above the head of the Alberta Railway & Irrigation Co.'s canal at Canadian gaging station.
[b] Measured below the head of the Alberta Railway & Irrigation Co.'s canal.
[c] Measured 2 miles below the head gates.
[d] Measured 3 miles below the head gates.
[e] Measured 1 mile below the head gates.

Miscellaneous measurements in St. Mary River drainage basin, 1900–1917—Continued.

Made by Canadian engineers.

Date.	Stream.	Locality.				Made by—	Discharge.
		Quarter.	Sec.	T.	R. [a]		
1895.							*Sec.-ft.*
July 19	St. Mary River	NE	18	2	24	J. S. Dennis	2,202.3
1906.							
Sept. 14	Boundary Creek	SW	20	1	26	P. M. Sauder	3.1
11	Rolph Creek		22	1	24	do	Dry.
15	Lee Creek		12	2	27	do	27.1
21	do	NE	9	3	25	J. F. Hamilton	19.22
1907.							
July 29	Boundary Creek	SW	20	1	26	P. M. Sauder	18.5
Aug. 6	do		1	1	26	I. J. Walmsley	14.95
5	Rolph Creek		21	2	24	do	0.86
July 29	Lee Creek		12	2	27	do	80.4
Aug. 1	do	NE	9	3	25	do	53.0
10	do	do	9	3	25	do	73.5
6	Snake Creek		30	2	24	P. M. Sauder	.0
1909.							
Sept. 28	Lee Creek	NW	10	3	25	J. S. Tempest	42.57
1910.							
Aug. 28	Boundary Creek	SE	19	1	26	J. S. Tempest	.41
Apr. 12	Rolph Creek	[b]				L. J. Gleeson	7.50
26	do	[b]				do	2.10
May 6	do	[b]				do	1.32
21	do	[b]				do	3.00
24	do	[b]				do	8.04
June 3	do	[b]				do	2.45
7	do	[b]				do	2.45
17	do	[b]				do	1.50
21	do	[b]				do	1.25
July 1	do	[b]				do	Dry.
Oct. 1	do	[b]				N. M. Sutherland	1.99
10	do		22	1	24	do	.0
24	do					do	.20
Apr. 12	Aetna Creek	[c]				L. J. Gleeson	.10
June 20	do	[c]				do	.10
1911.							
May 20	St. Mary River		5	1	25	L. J. Gleeson	2,717
June 20	do		5	1	25	do	2,635
28	do		5	1	25	do	3,264
July 4	do		11	3	25	do	2,645
14	do		5	1	25	do	1,607
25	do		11	3	25	do	942
Aug. 8	do		5	1	25	do	1,362
18	do		5	1	25	do	962
31	do		5	1	25	do	634
Sept. 9	do		11	3	25	do	2,201
Oct. 9	do		5	1	25	do	666
13	do		11	3	25	do	335
May 2	Boundary Creek		11	1	26	do	22.8
20	do		11	1	26	do	54.5
June 22	do		11	1	26	do	26.7
28	do		11	1	26	do	43.3
July 14	do		11	1	26	do	12.7
22	do		11	1	26	do	13.0
Aug. 18	do		11	1	26	do	20.1
31	do		11	1	26	do	11.2
Oct. 9	do		11	1	26	do	34.3
1912.							
Apr. 27	St. Mary River	NW	23	3	25	L. J. Gleeson	875
June 7	do	do	11	3	25	do	1,700
July 6	do	do	11	3	25	do	1,390
27	do	do	11	3	25	V. Meek	1,589
Aug. 13	do	do	11	3	25	do	618
Oct. 10	do	NE	25	1	25	G. F. Deas	454
Nov. 4	do	do	25	1	25	V. Meek	426
Sept. 2	do	SE	18	2	27	do	300
May 7	Boundary Creek		11	1	26	L. J. Gleeson	29.3
June 5	do		11	1	26	do	18.0
20	do		11	1	26	do	9.5
July 23	do		11	1	26	V. Meek	37.5

[a] Range numbers are all west of the fourth meridian. [b] Taylorville, Alta. [c] Near Aetna, Alta.

Miscellaneous measurements in St. Mary River drainage basin, 1900–1917—Continued.

Made by Canadian engineers.

Date.	Stream.	Locality.				Made by—	Discharge.
		Quarter.	Sec.	T.	R.[a]		
1912.							*Sec.-ft.*
Aug. 8	Boundary Creek	.....	11	1	26	V. Meek	11.2
29	.....do	.....	11	1	26	.....do	7.8
Oct. 24	.....do	.....	11	1	26	G. F. Deas	14.8
Nov. 18	.....do	.....	11	1	26	V. Meek	10.3
May 27	Snake Creek	SW...	23	2	25	L. J. Gleeson	.72
1913.							
July 19	St. Mary River	SW...	11	3	25	F. R. Burfield	1,137
Oct. 20	.....do	..do....	11	3	25	L. Danielsen	570
Nov. 3	.....do	..do....	11	3	25	.....do	452
May 28	Boundary Creek	NE...	27	1	26	F. R. Burfield	46
1914.							
May 23	St. Mary River	SW...	23	3	25	O. H. Hoover	2,282
Aug. 8	.....do	...do...	23	3	25	.....do	222

[a] Range numbers are all west of the fourth meridian.

Miscellaneous measurements of Alberta Railway & Irrigation Co.'s canal near Kimball, Alta., 1907–1909.

Date.	Made by—	Locality.	Discharge.
1907.			*Sec.-ft.*
Aug. 5	I. J. Walmsley	Sec. 21, T. 2, R. 24 W. 4	357.5
1908.			
Sept. 1	P. M. Sauder	Flume over Rolph Creek	189
16	H. R. Carscallen	.....do	411
1909.			
June 1	H. C. Ritchie	Flume over Rolph Creek	138
26	.....do	Bridge No. 1	611
Nov. 1	A. W. Pac	.....do	228

MILK RIVER DRAINAGE BASIN.

GENERAL FEATURES.

Milk River heads from springs scattered through the rolling foothills on the east side of the St. Mary lakes and river. This tract of hilly country is shown on the United States Government maps as St. Mary Ridge and forms part of the divide between waters flowing to Hudson Bay and those flowing to the Gulf of Mexico through the Missouri and Mississippi. (See Pl. I.)

The catchment area of Milk River is very large, extending through about 2 degrees of latitude, but as its basin is for the most part cut off from mountainous areas the river does not receive a constant supply of water from permanent bodies of snow and ice and its volume is subject to sudden fluctuations due largely to precipitation.

The river is formed by three principal branches—the South, Middle, and North forks. South Fork, considered the continuation of the main stream, is joined by the Middle Fork and flows northeasterly, crossing the international boundary in range 20. The North Fork, which also flows northeasterly, crosses the international boundary in R. 23 W., fourth meridian, very nearly in longitude 113° W., 19 miles west of the crossing of the South Fork. In Canada the

North Fork continues its northeasterly direction to a point nearly 14 miles due north of the boundary, where it turns sharply south and joins the South Fork near the middle of T. 2, R. 18. From the junction of these forks the river flows easterly on a course generally parallel to the international boundary, which it finally crosses close to the east boundary of R. 5 W., fourth meridian, 90 miles east of the crossing of the South Fork. At no place is the main stream more than 11 miles north of the international boundary, and the average distance is about 7 miles.

From its final crossing, in R. 5, the river flows southeastward to Havre, Mont., a point near the junction of the main line and Great Falls branch of the Great Northern Railway. Thence the general direction is easterly, bearing gradually to the south. The distance from the final crossing of the boundary to the junction of the Milk with the Missouri is, by general course, about 245 miles, and the distance of that junction due south of the international boundary is very nearly 70 miles. The length of the stream flowing in Canada from the North Fork crossing to the final crossing is, following the sinuosities, 216 miles, and from the South Fork crossing about 177 miles.

Along the North and South forks there are no flats of magnitude and the banks are in most places comparatively low but steep and the valleys narrow.

From the junction of the main branches to Pendant d'Oreille, in sec. 21, T. 2, R. 8, the river valley is as a rule narrow and treeless and slopes are comparatively gentle; but below Pendant d'Oreille, as far down as the mouth of Lost River, the banks are very high and steep and the area back of the river is composed principally of bad lands. The valley itself is narrow, wooded, and deeply cut by freshet channels from the clay and sandstone formation above. The bed of the river along this stretch is quicksand and shifts greatly at high stages.

From the mouth of Lost River to Havre the river banks and bed resemble those of the stretch last mentioned, though the bad lands are less pronounced and the banks are lower and less steep. The valley is somewhat wider, but the land is very poor, the vegetation scant, and forests are lacking.

Below Havre, however, the hills are lower, the slopes are gentle, and the valley itself, which here ranges in width from a mile to 4 miles, contains some first-class agricultural land which, under irrigation, gives very good growths of alfalfa, garden stuff, and cereals; and from Havre to the mouth of the river there is a considerable growth of trees, such as large poplars and willows.

The river bed remains unchanged and is composed of quicksand with occasional gravelly rapids. The fall is small, the current is

sluggish at low water, and in most places the banks are likely to be overflowed in flood water.

The area between Chinook and Malta, where the average width of the valley is about 3 miles, is in general composed of very flat land, and the soil ranges from sandy loam to "gumbo," which under irrigation yields good crops. From Malta around the big bend to a point northeast of Saco the valley is again narrow, and though wider than that above Havre, resembles that stretch of stream in some respects. Below this point the valley widens out and some very fine flats border the river on each side clear to its mouth.

Milk River in Montana is fed by numerous tributaries from both north and south between Havre and the mouth, those on the north rising between the Cypress Hills, Old-Man-on-his-Back Plateau, Boundary Plateau, and Wood Mountain, and those from the south rising in the Sweetgrass Hills, Bear Paws, and Little Rocky Mountains. In its course through Canada the stream receives a few small and unimportant tributaries that rise in the Sweetgrass Hills, but practically all the area immediately north of the river is drained into Pakowki Lake.

The area drained by Milk River might be expected to present a great variety of topographic conditions and in a sense it does, for the range in elevation is between about 1,900 and 7,000 feet above sea level. The greater part of this whole area, however, might be appropriately described as rolling prairie and foothill country. The outstanding topographic limits of the basin are the foothills of the Rocky Mountains in the Blackfeet Reserve, the Milk River Ridge, which extends northeastward from them into Canada, the Cypress Hills and Wood Mountain on the north, and the Sweetgrass Hills, the Bear Paw, and Little Rocky Mountains on the south. Between these limits can be found almost all varieties of prairie country, from level plains to steep, broken, clay cliffs, bare of vegetation; but as a whole the area is extremely rolling and is broken by numerous channels that carry much water during the freshet season but are dry for 10 or 11 months a year. Springs are numerous but small and have little effect on the flow in the main drainage channels.

Two remarkable depressions occur in what might otherwise be considered a part of the catchment area of Milk River—one in Tps. 3, 4, 5, and 6, Rs. 4 to 21 W. fourth meridian, and the other in the large tract east of Battle Creek and south of Frenchman River. The first depression, forming the drainage basin of Pakowki Lake, is at its lowest point 27 feet lower than the bed of Milk River to the south; the second, lying between the banks of Frenchman River on the north and east and the Boundary and Old-Man-on-his-Back plateaus on the south and west, is a large shallow basin full of small lakes and sloughs that have no outlets to the adjacent stream channels.

GAGING-STATION RECORDS.

STATIONS ON MAIN STREAM.

SOUTH FORK OF MILK RIVER NEAR INTERNATIONAL BOUNDARY.

LOCATION.—In SW. ¼ sec. 29, T. 37 N., R. 9 W., at Richard Croff's ranch, just above Kennedy Coulee, in Teton County, about 30 miles northeast of Browning, and 5 miles south of the international boundary.

DRAINAGE AREA.—288 square miles (measured on topographic map).

RECORDS AVAILABLE.—April 28, 1905, to December 31, 1917.

GAGE.—Stevens continuous water-stage recorder on the left bank, above the mouth of Kennedy Coulee and about 500 feet from Richard Croff's ranch house; prior to October 13, 1917, the station was on left bank, 400 feet farther upstream. April 28 to May 8, 1905, a staff gage was read; May 8, 1905, to April 13, 1913, overhanging chain gage. April 13, 1913, to December 31, 1917, Stevens continuous water-stage recorder supplemented by readings by the observer on an overhanging chain gage.

DISCHARGE MEASUREMENTS.—Made from cable 300 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of clay and small boulders. Growth of aquatic plants affects stage-discharge relation at low stages during summer. Banks high and not subject to overflow except during extreme floods.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 15.4 feet June 6, 1908, determined from high-water marks; flood width, 850 feet; flood cross-section, about 2,600 square feet; minimum stage recorded, 2.9 feet August 18–20, 1906 (discharge, 1 second-foot).

ICE.—Ice period extends from November to April. During mild winters the stage-discharge relation may be affected by ice for short periods only. Records for such periods are based on discharge measurements, temperature records, observer's notes, and hydrographic comparison with flow of other streams.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Stage-discharge relation affected by ice and by shifting control; changes covered by numerous discharge measurements. Gage-height records good since installation of water-stage recorder. Records beginning with 1913 are good; those previous to that year are fair.

COOPERATION.—Beginning with 1913 station maintained under a cooperative agreement between the Reclamation Service, Department of the Interior, Canada, the United States Reclamation Service, and the United States Geological Survey.

Discharge measurements of South Fork of Milk River near international boundary, 1905–1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1905.		*Feet.*	*Sec.-ft.*	1908.		*Feet.*	*Sec.-ft.*
Apr. 28	Stockman and Morse	3.60	51	July 31	Stewart and Huch	3.13	71.2
May 28	H. M. Morse	3.52	42	Aug. 29	do	2.90	41.0
July 21	do	3.13	10	Oct. 9	do	3.2	73.3
Aug. 30	C. C. Babb	2.80	2				
				1909.			
1906.				May 29	W. A. Lamb	4.51	448
May 13	W. B. Freeman	3.32	13.5	June 15	do	3.90	276
Sept. 16	Richards and Hartman	3.27	11.2	July 8	do	3.55	179
Oct. 24	Follansbee and Richards	3.48	21.7	Sept. 17	Stewart and Lamb	2.10	33
				Oct. 15	W. A. Lamb	2.62	35
1907.							
May 17	J. E. Stewart	5.29	442	1910.			
June 8	J. B. Pierson	5.65	546	Apr. 21	do	3.35	143
Sept. 8	Follansbee and Pierson	3.66	50.0	Sept. 16	M. E. McChristie	2.48	17.5

Discharge measurements of South Fork of Milk River near international boundary, 1905-1917—Continued.

Date.	Made by—	Gage height.	Discharge.
1911.		*Feet.*	*Sec.-ft.*
May 9	B. E. Jones	3.54	180
Aug. 29	do	2.71	44
1912.			
Aug. 24	W. A. Lamb	2.51	22
Nov. 15	do	2.81	55
1913.			
May 20	do	4.43	445
21	F. R. Burfield	4.14	373
21	W. A. Lamb	4.14	370
June 15	R. R. Randell	3.42	148
25	F. R. Burfield	3.16	102
July 9	do	2.99	81
23	do	2.80	50.4
27	J. M. Ray	3.05	87
Aug. 29	F. R. Burfield	2.56	21.2
Sept. 13	W. A. Lamb	2.51	18.1
Oct. 12	L. Danielson	2.90	73.2
Nov. 18	do	2.80	39.9
Dec. 20	W. A. Lamb	2.45	11.9
1914.			
Mar. 15	do	3.01	70
Apr. 10	O. H. Hoover	3.99	280
23	do	3.28	130
May 16	do	3.15	117
June 5	do	2.98	83
21	W. A. Lamb	2.72	37.8
26	O. H. Hoover	3.08	98
July 18	do	2.50	16.6
22	W. A. Lamb	2.41	10.0
Aug. 13	O. H. Hoover	2.43	10.8
Sept. 4	do	2.44	12.4
10	W. A. Lamb	2.51	15.8
19	O. H. Hoover	2.57	22.6
Oct. 15	do	3.38	167
Nov. 8	W. A. Lamb	2.74	43
Dec. 18	B. E. Jones	2.48	14.9
1915.			
Feb. 9	J. E. Degnan	2.47	17.0
20	W. A. Lamb	2.50	19.9
Mar. 18	J. E. Degnan	3.72	236
27	do	2.68	33.2
Apr. 22	V. A. Newhall	2.91	60
25	W. A. Lamb	2.80	53
May 7	V. A. Newhall	3.12	96
27	W. A. Lamb	2.92	68
June 17	V. A. Newhall	3.50	181
July 13	B. E. Jones	2.96	57
14	do	2.99	59
14	V. A. Newhall	3.00	66
Aug. 5	do	3.05	61
Aug. 8	Lamb and Hoyt	2.89	43
18	V. A. Newhall	2.90	47
31	do	2.76	29
Sept. 15	W. A. Lamb	3.36	116
Oct. 8	V. A. Newhall	3.31	104
Nov. 11	W. H. Storey	3.09	64
27	W. A. Lamb	2.91	52
Dec. 7	W. H. Storey	2.93	59
1916.			
Mar. 11	W. A. Lamb	6.25	1,430
17	S. H. Frame	3.86	229
Apr. 7	do	3.47	157
26	do	3.41	150
26	W. A. Lamb	3.45	156
May 24	Tuttle and Lamb	3.70	225
June 1	S. H. Frame	4.25	395
11	A. H. Tuttle	4.45	411
21	S. H. Frame	4.38	433
27	do	4.35	468
July 19	W. A. Lamb	3.35	146
27	W. A. Burton	3.15	95
Aug. 22	W. A. Lamb	3.01	77
Sept. 6	S. H. Frame	3.22	113
19	W. A. Lamb	2.83	52
28	S. H. Frame	2.88	53
Nov. 16	do	2.90	53
26	W. A. Lamb	2.90	62
1917.			
Jan. 5	W. H. Rowley	2.65	27
24	do	2.80	29
Feb. 22	G. S. Wenden	2.81	33
Mar. 8	A. H. Tuttle	2.70	23
15	G. S. Wenden	2.81	32
Apr. 4	A. W. P. Lowrie	2.75	35
16	W. A. Lamb	3.87	217
May 5	A. W. P. Lowrie	3.91	267
17	W. A. Lamb	4.32	450
31	A. W. P. Lowrie	4.76	680
June 16	W. A. Lamb	4.11	315
21	A. W. P. Lowrie	3.83	273
29	W. A. Lamb	3.43	162
July 11	A. W. P. Lowrie	3.12	96
22	W. A. Lamb	2.86	56
28	A. W. P. Lowrie	2.78	46
Aug. 21	W. A. Lamb	2.68	28
26	A. W. P. Lowrie	2.62	23
Sept. 12	W. A. Lamb	2.70	34
Oct. 13	A. W. P. Lowrie	1.68	30
Nov. 8	do	1.80	42
11	B. E. Jones	1.80	44
21	S. H. Frame	1.79	35
Dec. 6	D. G. Chadsey	1.68	20

NOTE.—1905: Aug. 30, discharge estimated.
1913: Dec. 20, ice at gage.
1914: Dec. 18, river frozen across at gage and for some distance below.
1915: Feb. 20, channel open above gage at control, but frozen across at gage; Nov. 11, stage-discharge relation affected by ice.
1917: Dec. 6, stage-discharge relation affected by ice.

Daily discharge, in second-feet, of South Fork of Milk River near international boundary, 1905–1917.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1905.									
1	.....	.....	40	30	46	30	3	12	.....
2	.....	.....	40	30	46	30	3	12	.....
3	.....	.....	40	40	51	30	2	12	.....
4	.....	.....	40	40	51	21	2	12	.....
5	.....	.....	40	30	40	18	6	14	.....
6	.....	.....	40	40	40	14	6	14	.....
7	.....	.....	40	40	30	14	6	18	.....
8	.....	.....	30	46	30	9	6	20	.....
9	.....	.....	40	40	26	9	4	23	.....
10	.....	.....	64	40	26	9	5	21	.....
11	.....	.....	64	40	21	9	6	20	.....
12	.....	.....	64	40	14	6	6	18	.....
13	.....	.....	64	30	14	6	6	14	.....
14	.....	.....	71	30	14	6	6	18	.....
15	.....	.....	64	30	14	6	4	21	.....
16	.....	.....	58	40	14	6	4	23	.....
17	.....	.....	51	40	14	6	4	23	.....
18	.....	.....	51	40	14	5	4	.....	.....
19	.....	.....	51	35	14	4	4	.....	.....
20	.....	.....	51	51	12	4	4	.....	.....
21	.....	.....	71	51	9	3	4	.....	.....
22	.....	.....	78	51	9	2	2	.....	.....
23	.....	.....	71	51	9	2	2	.....	.....
24	.....	.....	58	51	9	2	2	.....	.....
25	.....	.....	51	58	9	2	2	.....	.....
26	.....	.....	46	109	14	2	2	.....	.....
27	.....	.....	40	144	21	2	2	.....	.....
28	.....	51	40	86	21	2	6	.....	.....
29	.....	46	40	71	30	2	9	.....	.....
30	.....	40	35	46	35	2	9	.....	.....
31	.....	.....	40	.....	30	2	.....	.....	.....
1906.									
1	.....	37	27	406	32	2	10	6	16
2	.....	10	27	270	29	3	10	6	14
3	.....	13	27	181	27	2	10	6	18
4	.....	10	32	140	23	5	10	6	13
5	.....	32	32	122	19	6	8	10	16
6	.....	118	32	109	19	6	7	10	7
7	.....	109	27	95	19	6	6	10	13
8	.....	92	27	84	19	6	6	10	19
9	.....	72	23	76	14	5	6	10	21
10	.....	42	19	68	10	5	5	10	27
11	.....	39	16	57	8	4	5	10	25
12	.....	37	16	54	8	3	6	10	32
13	.....	34	14	54	9	2	8	10	27
14	.....	32	13	54	19	3	9	10	39
15	.....	32	13	48	18	2	10	10	42
16	10	32	29	42	16	2	10	10	19
17	10	34	32	39	13	2	10	13	18
18	10	37	27	37	13	1	8	16	42
19	10	37	25	32	13	1	8	16	39
20	10	37	27	32	8	1	7	16	35
21	10	37	32	32	8	2	6	16	32
22	10	27	45	64	6	14	6	16	29
23	10	27	39	156	6	42	6	21	25
24	10	37	79	122	5	46	6	29	23
25	10	37	136	100	5	42	6	23	19
26	13	37	187	76	5	35	5	23	19
27	29	32	166	51	5	27	6	27	21
28	54	32	136	45	5	18	6	25	21
29	76	27	350	39	4	16	6	21	19
30	72	27	277	37	4	13	6	19	19
31	67	.....	427	.....	3	10	.....	18	.....

Daily discharge, in second-feet, of South Fork of Milk River near international boundary, 1905–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1907.									
1	.....	.....	165	258	250	53	85	68	46
2	.....	.....	165	299	224	56	65	60	46
3	.....	.....	182	286	214	68	56	60	46
4	.....	.....	199	277	214	60	50	60	46
5	.....	.....	199	245	199	56	46	53	46
6	.....	.....	219	224	182	53	43	53	46
7	.....	.....	224	321	165	60	60	65	46
8	.....	.....	378	534	158	60	43	68	46
9	.....	370	623	428	175	60	46	60	46
10	.....	341	437	286	170	60	46	65	46
11	.....	313	419	250	158	53	71	53	38
12	.....	286	449	245	152	53	82	53	34
13	.....	267	305	250	147	60	89	53	22
14	.....	277	245	232	158	60	100	53	22
15	.....	272	277	199	170	65	114	46	38
16	.....	232	255	224	199	60	158	46	46
17	.....	194	467	219	182	53	286	46	46
18	.....	175	428	189	158	46	267	46	24
19	.....	147	349	170	143	43	152	46	24
20	.....	125	341	170	129	46	152	46	46
21	.....	175	333	199	125	43	136	46	46
22	.....	170	294	1,410	143	40	114	46	46
23	.....	219	277	1,690	129	43	82	46	46
24	.....	175	286	769	114	34	71	46	.....
25	.....	147	250	458	100	30	76	46	.....
26	.....	143	224	349	89	38	68	46	.....
27	.....	114	206	327	82	46	71	46	.....
28	.....	60	219	305	85	65	65	46	.....
29	.....	108	272	267	65	68	68	46	.....
30	.....	165	267	245	56	71	56	46	.....
31	.....	.....	272	.....	60	89	.....	46	.....
1908.									
1	.....	678	125	1,240	.....	80	41	113	122
2	.....	623	136	1,180	.....	80	41	113	132
3	.....	678	129	629	.....	80	41	96	113
4	.....	695	143	1,750	.....	80	41	96	113
5	.....	655	175	.....	.....	80	32	142	113
6	.....	613	129	.....	.....	80	32	176	113
7	.....	571	136	.....	.....	80	32	153	96
8	.....	597	143	.....	.....	80	32	153	80
9	.....	603	158	.....	.....	80	32	132	80
10	.....	571	219	.....	.....	80	32	113	80
11	.....	540	194	.....	.....	80	28	104	65
12	.....	534	286	.....	.....	80	25	96	65
13	.....	509	341	.....	.....	80	25	65	65
14	.....	497	384	.....	.....	80	25	52	80
15	.....	646	550	.....	.....	80	25	65	80
16	.....	321	534	.....	.....	80	25	65	80
17	.....	299	258	.....	.....	65	32	65	80
18	.....	250	206	.....	.....	65	41	65	96
19	.....	240	182	.....	.....	65	58	52	132
20	.....	219	219	.....	.....	65	52	41	132
21	.....	199	206	.....	.....	65	41	41	132
22	.....	170	219	.....	.....	65	32	41	132
23	.....	419	194	.....	.....	65	41	52	132
24	.....	136	182	.....	.....	65	52	52	132
25	.....	104	206	.....	.....	65	41	52	132
26	.....	104	443	.....	.....	65	41	52	113
27	.....	147	565	.....	.....	65	52	58	113
28	.....	152	550	.....	.....	65	113	65	96
29	.....	152	327	.....	.....	58	176	72	96
30	.....	136	286	.....	.....	41	132	80	96
31	.....	.....	458	.....	.....	41	.....	96	.....

Daily discharge, in second-feet, of South Fork of Milk River near international boundary, 1905–1917—Continued.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1909.								1909.							
1	.....	385	147	147	36	32	32	16	.....	269	169	47	32	32	30
2	.....	400	127	127	41	41	32	17	.....	269	77	47	32	32	27
3	.....	400	127	109	41	41	36	18	.....	385	70	41	41	22	36
4	.....	355	147	109	41	41	46	19	.....	283	70	41	41	36	52
5	.....	385	192	100	41	36	58	20	.....	445	70	41	36	36	41
6	.....	297	204	77	41	36	64	21	.....	460	64	41	41	36	41
7	.....	297	312	77	36	32	70	22	.....	326	58	41	41	36	41
8	.....	538	192	77	36	27	77	23	.....	242	58	41	41	52	64
9	.....	815	158	70	32	27	46	24	.....	216	52	36	36	32	64
10	.....	554	137	64	32	32	46	25	.....	192	52	32	36	36	52
11	.....	400	127	64	32	36	52	26	.....	192	109	32	32	36	41
12	.....	355	118	58	41	41	77	27	.....	180	460	36	32	36	41
13	.....	326	109	58	52	32	109	28	.....	169	900	41	36	36	41
14	.....	297	100	52	41	32	32	29	460	147	782	41	52	32	41
15	.....	269	92	52	36	32	30	30	415	169	283	36	32	36	41
								31	385	.....	180	32	.....	36	.....

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1910.												
1	.....	.....	.....	94	102	68	23	9	23	32	30	.....
2	.....	.....	.....	94	97	68	28	9	28	32	28	.....
3	.....	.....	.....	94	86	65	23	8	32	37	28	.....
4	.....	.....	.....	79	79	72	28	8	32	37	30	.....
5	.....	.....	.....	65	86	75	28	10	42	32	20	.....
6	.....	.....	.....	79	76	62	23	9.6	42	32	32	.....
7	.....	.....	.....	126	76	62	28	13	40	32	30	.....
8	.....	.....	.....	154	91	172	28	10	47	32	28	.....
9	.....	.....	.....	168	102	246	25	11	40	28	30	.....
10	.....	.....	.....	177	111	130	28	13	37	28	23	.....
11	.....	.....	.....	195	146	94	23	9	42	28	37	.....
12	.....	.....	.....	184	140	82	28	10	32	28	37	.....
13	.....	.....	.....	184	120	68	23	9	32	28	28	.....
14	.....	.....	.....	168	108	58	20	9	28	28	28	.....
15	.....	.....	.....	120	140	58	23	10	28	28	23	.....
16	.....	.....	.....	111	130	52	16	10	28	28	25	.....
17	.....	.....	.....	108	206	55	13	16	23	28	28	.....
18	.....	.....	.....	126	184	50	10	13	23	32	40	.....
19	.....	.....	.....	130	150	44	10	10	23	37	28	.....
20	.....	.....	.....	150	208	47	13	10	20	37	30	.....
21	.....	.....	.....	146	172	42	10	9	17	32	37	.....
22	.....	.....	.....	126	130	42	13	10	28	28	16	.....
23	.....	.....	.....	108	108	47	9.6	9	32	30	37	.....
24	.....	.....	.....	111	94	52	9	10	37	28	52	.....
25	.....	.....	.....	134	94	56	10	16	34	32	28	.....
26	.....	.....	.....	140	94	42	9	13	47	32	23	.....
27	.....	.....	.....	140	91	34	10	13	47	25	23	.....
28	.....	.....	.....	130	79	32	8.4	10	42	30	23	.....
29	.....	.....	.....	126	79	30	9	13	40	42	23	.....
30	.....	.....	.....	108	84	29	10	16	32	42	23	.....
31	.....	.....	.....	.....	72	.....	9	13	.....	32	.....	.....

Daily discharge, in second-feet, of South Fork of Milk River near international boundary, 1905–1917—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911.												
1	.....	.....	.....	.....	154	172	273	80	28	72	.....	.....
2	.....	.....	.....	.....	161	195	184	73	23	72	.....	.....
3	.....	.....	.....	.....	184	195	172	122	20	72	.....	.....
4	.....	.....	.....	.....	184	195	150	88	120	86	.....	.....
5	.....	.....	.....	.....	133	172	146	113	400	94	.....	.....
6	.....	.....	.....	.....	273	172	134	85	400	86	.....	.....
7	.....	.....	.....	.....	133	150	104	104	372	72	.....	.....
8	.....	.....	.....	.....	172	195	84	113	342	72	.....	.....
9	.....	.....	.....	.....	195	220	76	104	246	65	.....	.....
10	.....	.....	.....	.....	172	161	76	91	184	65	.....	.....
11	.....	.....	.....	.....	172	148	75	97	124	65	.....	.....
12	.....	.....	.....	.....	154	138	72	71	102	65	.....	.....
13	.....	.....	.....	.....	168	128	64	71	86	65	.....	.....
14	.....	.....	.....	.....	357	128	61	48	79	65	.....	.....
15	.....	.....	.....	.....	520	124	61	48	72	65	.....	.....
16	.....	.....	.....	.....	1,040	113	64	43	72	65	.....	.....
17	.....	.....	.....	.....	648	109	115	43	72	65	.....	.....
18	.....	.....	.....	.....	357	101	90	41	72	65	.....	.....
19	.....	.....	.....	.....	286	92	124	36	72	65	.....	.....
20	.....	.....	.....	.....	246	78	115	33	69	65	.....	.....
21	.....	.....	.....	.....	220	108	75	35	65	65	.....	.....
22	.....	.....	.....	.....	220	184	75	32	79	72	.....	.....
23	.....	.....	.....	273	233	130	72	37	86	72	.....	.....
24	.....	.....	.....	273	220	386	72	35	106	72	.....	.....
25	.....	.....	.....	300	246	918	64	32	120	65	.....	.....
26	.....	.....	.....	342	273	536	55	32	111	20	.....	.....
27	.....	.....	.....	300	273	260	49	37	99	20	.....	.....
28	.....	.....	.....	208	273	273	49	37	75	28	.....	.....
29	.....	.....	.....	172	233	246	44	32	86	42	.....	.....
30	.....	.....	.....	154	195	184	51	39	72	37	.....	.....
31	.....	.....	.....	.....	184	.....	78	28	.....	37	.....	.....
1912.												
1	.....	.....	.....	445	144	124	140	36	18	42	9	42
2	.....	.....	.....	445	134	110	140	46	20	48	31	31
3	.....	.....	.....	445	154	106	134	60	26	48	26	36
4	.....	.....	.....	445	154	97	92	81	31	60	9	31
5	.....	.....	.....	445	144	97	71	81	42	48	26	31
6	.....	.....	.....	286	144	97	60	60	48	48	36	31
7	.....	.....	.....	195	134	97	54	48	46	48	12	31
8	.....	.....	.....	286	144	97	71	42	42	48	16	31
9	.....	.....	.....	342	195	92	86	36	36	60	26	31
10	.....	.....	.....	342	164	86	97	36	31	48	81	.....
11	.....	.....	.....	328	144	77	86	34	28	48	54	.....
12	.....	.....	.....	342	144	74	71	31	26	60	74	.....
13	.....	.....	.....	208	128	74	74	31	20	48	60	.....
14	.....	.....	.....	154	124	81	71	28	20	48	36	.....
15	.....	.....	.....	144	140	74	63	26	16	48	33	.....
16	.....	.....	.....	144	134	81	60	48	16	48	42	.....
17	.....	.....	.....	154	148	89	54	60	16	48	31	.....
18	.....	.....	.....	174	140	74	58	48	20	48	48	.....
19	.....	.....	.....	184	124	71	58	42	23	48	31	.....
20	.....	.....	.....	164	174	67	86	36	28	48	20	.....
21	.....	.....	.....	154	632	63	168	34	31	26	48	.....
22	.....	.....	.....	144	731	54	124	31	36	36	67	.....
23	.....	.....	.....	154	400	60	124	28	46	16	81	.....
24	.....	.....	.....	164	260	54	115	26	48	16	67	.....
25	.....	.....	.....	154	208	50	102	23	50	60	20	.....
26	.....	.....	.....	154	184	48	81	20	50	48	20	.....
27	.....	.....	.....	144	174	46	63	20	48	42	16	.....
28	.....	.....	.....	144	164	42	50	20	54	31	20	.....
29	.....	.....	.....	134	148	48	48	16	48	48	42	.....
30	.....	.....	.....	144	144	81	42	16	42	36	42	.....
31	.....	.....	.....	.....	134	.....	36	16	.....	42	.....	.....

Daily discharge, in second-feet, of South Fork of Milk River near international boundary, 1905–1917—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1913.												
1					196	315	173	50	25	22		34
2					206	289	141	45	24	22		27
3					248	277	125	40	23	24		29
4					214	260	122	42	21	36		28
5					196	234	125	39	20	39		30
6					194	218	112	38	17	38		35
7					216	204	98	44	16	43		30
8					232	189	92	46	16	46		27
9					204	184	85	73	15	61		27
10					196	191	76	104	16	45		23
11					243	198	79	87	17	49		
12					308	178	87	63	19	64		
13				864	311	162	81	51	17	131		
14				845	308	151	74	51	17	112		
15				734	286	151	67	54	18	72		
16				678	271	143	64	50	18	50		
17				516	361	131	58	48	18	50		
18				462	341	125	57	48	18	27	44	
19				588	494	125	54	50	22	38	50	
20				570	445	145	50	45	22	64	20	
21				588	365	147	51	38	25	104	27	
22				534	361	120	50	36	29	123	32	
23				277	389	114	57	31	38	90	39	
24				277	368	114	50	27	40	51	46	
25				248	365	104	50	25	38	35	51	
26				248	382	143	50	24	32	38	49	
27				351	410	324	87	24	29	38	43	
28				344	417	386	67	24	27	31	36	
29				286	396	321	61	23	23	25	35	
30				211	372	224	58	22	22	25	38	
31					334		58	22		25		
1914.												
1				116		63	37	7.0	14	11	30	
2				128		63	30	6.6	15	15	29	
3				140		66	27	6.2	11	23	33	
4				153		68	24	4.6	13		44	
5				381		74	28	4.6	14		49	
6				429		85	35	4.4	13		40	
7				266		83	33	4.4	13		36	
8				222		66	24	4.4	15		37	
9				283		58	21	6.6	19			
10				280		52	20	9.7	17			
11				283		52	20	12	17			
12				488		47	20	12	20			
13				470		64	18	9.0	25			
14				307		124	16	8.2	24	88		
15			83	245		112	16	6.2	24	174		
16			74	255	110	85	15	4.8	25	222		
17			81	214	110	66	16	12	23	206		18
18			83	157	105	55	16	37	24	177		17
19			78	130	101	46	15	47	22	124		16
20			83	188	109	42	13	24	20	97		12
21			73	204	130	39	11	17	19	73		9.0
22			69	153	116	35	10	13	17	58		7.8
23			88	135	99	37	9.0	14	15	49		7.0
24			103	166	88	39	8.6	25	15	43		7.0
25			92	172	85	60	9.0	35	14	39		7.4
26			94		81	92	8.2	28	13	37		8.2
27			94		80	76	7.4	22	10	34		8.2
28			96		74	55	6.6	18	10	32		9.0
29			94		71	49	7.0	15	9.7	29		8.6
30			90		68	43	7.0	15	9.0	30		8.6
31			81		64		7.0	15		32		9.0

Daily discharge, in second-feet, of South Fork of Milk River near international boundary, 1905–1917—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1915.												
1	9.0	12	20	96	147	50	160	160	29	67	60	52
2	9.0	12	19	258	232	100	150	120	51	68	62	52
3	14	12	19	335	216	534	200	100	367	88	64	52
4	14	12	19	159	147	804	170	80	388	97	66	57
5	15	13	19	112	130	826	140	64	140	99	66	62
6	15	13	15	99	130	368	160	58	104	94	67	67
7	15	13	16	87	109	247	140	50	79	104	51	56
8	15	13	16	92	92	229	110	47	70	101	39	60
9	14	16	18	71	81	229	90	48	78	97	42	60
10	14	12	16	64	74	300	85	50	177	101	50	52
11	14	13	13	63	66	200	75	60	158	91	64	52
12	15	12	14	66	66	175	65	43	177	96	63	52
13	15	10.4	14	68	74	150	55	47	149	91	62	52
14	14	10.4	15	74	188	135	58	53	144	90	61	52
15	14	12	18	71	263	172	61	57	121	102	60	52
16	13	13	73	69	229	190	61	55	110	97	60	39
17	13	15	177	53	212	172	73	58	94	88	59	39
18	12	16	237	53	168	183	339	47	88	80	58	28
19	12	16	212	56	174	226	223	50	90	70	57	28
20	12	20	181	60	149	183	182	58	97	61	56	34
21	11	20	190	63	126	147	182	73	91	70	55	28
22	11	20	206	63	109	133	182	101	82	70	55	34
23	10	20	172	56	97	133	184	74	76	64	54	34
24	10	20	138	52	88	122	190	62	84	64	53	34
25	9.0	20	103	50	90	255	195	60	94	61	52	39
26	9.0	20	69	50	87	624	205	55	82	61	52	34
27	9.0	20	34	50	71	316	213	55	84	60	52	34
28	10	20	68	47	68	323	235	53	85	70	52	28
29	10	.....	56	43	69	247	235	47	85	67	52	28
30	11	.....	52	52	68	140	175	34	79	61	52	28
31	12	.....	60	.....	55	.....	125	30	.....	61	.....	28
1916.												
1	28	28	75	220	194	419	467	85	59	59	74	45
2	24	28	75	257	266	509	338	72	59	59	74	45
3	28	28	75	225	251	334	314	65	95	66	66	52
4	28	34	83	184	239	266	304	60	279	74	74	45
5	28	34	75	165	242	266	269	56	202	90	66	52
6	28	28	75	147	239	338	242	56	112	98	74	45
7	28	28	75	158	234	266	217	55	87	90	74	45
8	28	24	111	174	234	223	217	53	77	98	18	52
9	28	28	900	201	207	201	217	84	71	98	22	48
10	28	28	1,640	214	201	291	191	222	70	90	22	45
11	28	28	1,520	217	186	381	167	167	68	98	37	34
12	28	34	1,300	242	184	334	179	121	66	98	52	34
13	28	34	777	234	184	251	145	100	65	90	45	40
14	28	34	568	204	186	231	145	107	58	90	45	34
15	28	39	448	217	191	217	145	100	62	82	52	40
16	24	2,840	346	251	194	223	125	80	59	82	52	30
17	19	1,880	308	214	186	228	145	74	58	74	66	30
18	24	1,260	293	196	174	239	145	104	53	74	59	30
19	28	792	281	196	165	257	135	147	49	74	74	30
20	28	1,230	314	189	160	359	116	111	48	82	74	30
21	28	900	355	177	158	431	109	92	47	74	66	29
22	28	359	314	177	156	545	102	77	47	74	66	29
23	24	359	234	174	158	616	100	74	46	74	64	29
24	24	359	199	181	196	439	98	68	45	66	62	29
25	24	341	191	174	260	359	97	65	49	59	59	29
26	19	275	186	152	322	381	97	64	49	59	59	28
27	24	92	207	169	616	460	120	71	53	66	45	28
28	28	92	212	204	626	484	154	70	56	74	45	28
29	28	83	189	212	484	536	112	65	58	66	45	28
30	34	.....	179	201	592	670	100	64	59	66	52	28
31	28	.....	174	.....	451	.....	93	60	.....	66	.....	28

Daily discharge, in second-feet, of South Fork of Milk River near international boundary, 1905–1917—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1917.												
1	28	28	23	23	214	601	154	45	40	30	96	32
2	27	23	28	26	372	497	159	42	35	28	94	25
3	27	23	20	28	366	393	154	40	35	27	92	19
4	26	23	28	117	361	350	154	53	37	26	79	19
5	26	28	23	423	327	311	132	55	37	25	59	20
6	26	32	28	829	491	308	112	49	37	28	56	20
7	21	28	23	975	616	272	101	52	37	32	44	18
8	26	23	23	1,170	741	301	97	67	37	37	43	18
9	26	23	23	1,160	841	314	97	56	48	32	48	17
10	26	28	26	1,110	796	405	97	56	53	30	45	16
11	31	23	28	1,050	751	602	91	53	42	28	43	16
12	30	23	23	1,010	781	826	88	48	35	30	41	14
13	18	23	20	490	811	590	101	45	32	32	39	12
14	28	23	23	303	799	314	114	40	32	34	39	11
15	32	23	33	179	787	262	97	35	30	31	40	10
16	24	20	23	238	776	288	79	35	30	49	41	12
17	22	23	23	207	456	253	79	30	28	44	39	11
18	21	23	28	238	410	247	72	30	27	38	37	11
19	20	23	23	270	365	256	73	35	26	49	36	12
20	23	23	23	318	470	250	58	30	25	49	35	18
21	32	23	23	377	575	268	52	30	24	54	35	18
22	32	33	20	354	681	278	55	25	23	59	34	19
23	28	32	23	331	609	232	52	28	28	49	34	18
24	29	38	23	308	537	226	49	25	32	59	36	20
25	23	28	23	293	537	218	49	23	53	56	32	22
26	23	28	23	278	537	218	46	25	37	54	33	21
27	23	28	28	242	537	191	46	28	35	52	33	22
28	23	23	23	207	491	166	44	25	37	49	34	24
29	23	.....	28	200	765	159	41	23	32	47	34	30
30	28	.....	30	196	801	154	44	23	32	36	33	40
31	28	.....	32	.....	706	.....	44	35	.....	34	.....	120

NOTE.—1906: Ice at gage Mar. 16–24 and Apr. 3–5; stage-discharge relation apparently not affected; open-channel rating curve applied.

1908: Gage washed out June 6 and replaced Aug. 1.

1909: Stage-discharge relation affected by ice Nov. 28–30; daily discharge estimated.

1912: Daily discharge Apr. 1–2 estimated because of possible effect of ice on stage-discharge relation.

1913: Gage heights not reported Oct. 30 to Nov. 17; discharge estimated Oct. 30–31; mean discharge Nov. 1–17 estimated at 25 second-feet. Stage-discharge relation affected by ice Dec. 11–31; mean discharge estimated at 15 second-feet.

1914: Gage heights not reported Apr. 26 to May 15, Oct. 4–13, and Nov. 9 to Dec. 16; discharge estimated as follows: Apr. 26–30, 130 second-feet; May 1–15, 148 second-feet; Oct. 4–13, 35 second-feet; Nov. 9–30, 35 second-feet; Dec. 1–5, 30 second-feet; Dec. 6–10, 25 second-feet; Dec. 11–15, 20 second-feet.

1915: Gage heights not reported, daily discharge estimated, for following periods: Jan. 2–3, 7–10, 13–25, 27–31, Feb. 2–7, Mar. 23–26, Apr. 18–21, June 1–2, 10–13, and 30, July 1–12 and 28–31, Aug. 1–4. Stage-discharge relation affected by ice Nov. 11–12 and Nov. 29.

1916: Stage-discharge relation affected by ice Nov. 23–24 and Dec. 18–31.

1917: Stage-discharge relation affected by ice Jan. 1–4.

Discharge for periods in 1915, 1916, and 1917 in which stage-discharge relation was affected by ice was estimated from discharge measurements, gage heights, and records of precipitation and temperature.

Monthly discharge of South Fork of Milk River near international boundary, 1905–1917.

[Drainage area, 288 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1905.						
May	78	30	51	0.177	0.20	3,117
June	144	30	49	.170	.19	2,916
July	51	9	24	.063	.10	1,445
August	30	2	8.5	.030	.03	523
September	9	2	4.4	.015	.02	262
October 1–17	23	12	17	.059	.04	587
The period						8,850
1906.						
March 16–31	76	10	25.7	.089	.05	816
April	118	10	40.2	.140	.16	2,390
May	427	13	76.1	.264	.30	4,680
June	406	32	90.7	.315	.35	5,400
July	32	3	12.6	.044	.05	775
August	46	1	10.7	.037	.04	658
September	10	5	7.3	.025	.03	434
October	29	6	14.3	.050	.06	879
November	42	7	23.6	.082	.09	1,400
The period						17,400
1907.						
April 9–30	370	60	203	.705	.58	8,860
May	623	165	301	1.04	1.20	18,500
June	1,690	170	378	1.31	1.46	22,500
July	250	56	148	.514	.59	9,100
August	89	30	54.6	.190	.22	3,360
September	286	43	93.9	.326	.36	5,590
October	68	46	51.8	.180	.21	3,190
November 1–23	46	22	40.8	.142	.12	1,860
The period						73,000
1908.						
April	695	104	402	1.40	1.56	23,900
May	565	125	267	.927	1.07	16,400
August	80	41	71.0	.247	.28	4,370
September	176	25	47.1	.164	.18	2,800
October	176	41	84.5	.293	.34	5,200
November	132	65	103	.358	.40	6,130
The period						58,800
1909.						
June	815	147	334	1.16	1.29	19,900
July	900	52	185	.642	.74	11,400
August	147	32	60.2	.209	.24	3,700
September	52	32	38.0	.132	.15	2,260
October	41	32	34.5	.120	.14	2,120
November	109	27	48.7	.169	.19	2,900
The period						42,300
1910.						
April	195	65	129	.448	.50	7,680
May	208	72	114	.396	.46	7,010
June	246	29	67.8	.235	.26	4,030
July	28	8.4	17.7	.062	.07	1,090
August	16	8	10.9	.038	.04	670
September	47	17	33.3	.116	.13	1,980
October	42	28	31.5	.109	.13	1,940
November	52	16	28.4	.100	.11	1,690
The period						26,100
1911.						
April 23–30			253	.878	.26	4,010
May	1,040	133	267	.927	1.07	16,400
June	918	78	207	.719	.80	12,300
July	273	44	94.3	.327	.38	5,800
August	122	28	60.6	.210	.24	3,730
September	400	20	128	.444	.50	7,620
October	94	20	62.5	.217	.25	3,840
The period						53,700

Monthly discharge of South Fork of Milk River near international boundary, 1905–1917—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1912.						
April	445	134	239	0.830	0.93	14,200
May	731	124	196	.681	.79	12,100
June	124	42	77.0	.267	.30	4,580
July	168	36	83.2	.289	.33	5,120
August	81	16	37.4	.130	.15	2,300
September	54	16	33.5	.116	.13	1,990
October	60	16	44.9	.156	.18	2,760
November	81	9	37.5	.130	.14	2,230
December 1–9	42	31	32.8	.114	.04	586
The period						45,900
1913.						
April	864	211	479	1.66	1.11	17,100
May	494	196	311	1.08	1.24	19,100
June	386	104	196	.680	.76	11,700
July	173	50	79.3	.275	.32	4,880
August	104	22	44.0	.153	.18	2,700
September	40	15	22.7	.079	.09	1,350
October	131	22	52.2	.181	.21	3,210
November	51	20	31.2	.108	.12	1,860
December	34	15	19.5	.068	.08	1,200
The period						63,100
1914.						
March 15–31	163	69	85.6	.297	.19	2,890
April	488	116	220	.764	.85	13,100
May		64	120	.417	.48	7,380
June	124	35	63.2	.219	.24	3,760
July	37	6.6	17.3	.060	.07	1,060
August	47	4.4	14.4	.050	.06	885
September	25	9.0	16.7	.058	.06	994
October	222	11	62.7	.218	.25	3,860
November			35.6	.124	.14	2,120
December			17.7	.061	.07	1,090
The period						37,100
1915.						
January	15	9.0	12.3	.043	.05	756
February	20	10.4	15.2	.053	.06	844
March	237	13	73.5	.255	.29	4,520
April	335	43	84.4	.293	.33	5,020
May	262	55	125	.434	.50	7,690
June	826	50	264	.917	1.02	15,700
July	339	55	152	.528	.61	9,350
August	160	30	62.9	.218	.25	3,870
September	388	29	118	.410	.46	7,020
October	104	60	80.4	.279	.32	4,940
November	67	39	56.5	.196	.22	3,360
December	67	28	43.5	.151	.17	2,670
The year	826	9	90.8	.315	4.28	65,700
1916.						
January	34	19	26.7	.093	.11	1,640
February	2,840	24	390	1.35	1.46	22,400
March	1,640	75	380	1.32	1.52	23,400
April	257	147	198	.688	.77	11,800
May	626	156	262	.910	1.05	16,100
June	670	201	358	1.24	1.38	21,300
July	467	93	174	.604	.70	10,700
August	222	53	86.7	.301	.35	5,330
September	279	45	73.5	.255	.28	4,370
October	98	59	77.7	.270	.31	4,780
November	74	18	56.1	.195	.22	3,340
December	52	28	36.1	.125	.14	2,220
The year	2,840	18	141	.490	8.29	127,000

Monthly discharge of South Fork of Milk River near international boundary, 1905–1917—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1917.						
January	32	18	25.8	0.090	0.10	1,590
February	38	20	25.7	.089	.09	1,430
March	33	20	24.8	.086	.10	1,520
April	1,170	23	431	1.50	1.67	25,600
May	841	214	591	2.05	2.36	36,300
June	826	154	325	1.13	1.26	19,300
July	159	41	84.9	.295	.34	5,220
August	67	23	38.3	.133	.15	2,360
September	53	23	34.5	.120	.13	2,050
October	59	25	39.6	.138	.16	2,430
November	96	32	46.1	.160	.18	2,740
December	120	10	22.1	.077	.09	1,360
The year	1,170	10	176	.611	6.63	102,000

NOTE.—Determinations of mean monthly discharge for January, February, March, and December, 1910, as originally published, have been discarded as not based on sufficient data.

Mean monthly discharge, in second-feet, of South Fork of Milk River near international boundary, 1905–1917.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total in acre-feet.
1905	.....	.....	.....	.....	51	49	24	8.5	4.4	[a] 17	.....	.....	8,850
1906	.....	.....	[b] 25.7	40.2	76.1	90.7	12.6	10.7	7.3	14.3	23.6	.....	17,400
1907	.....	.....	.....	[c] 203	301	378	148	54.6	93.9	51.8	[d] 40.8	.....	73,000
1908	.....	.....	.....	402	267	.....	.....	71.0	47.1	84.5	103	.....	58,800
1909	.....	.....	.....	.....	.....	334	185	60.2	38.0	34.5	48.7	.....	42,300
1910	.....	.....	.....	129	114	67.8	17.7	10.9	33.3	31.5	28.4	.....	26,100
1911	.....	.....	.....	[e] 253	267	207	94.3	60.6	128.0	62.5	.....	.....	53,700
1912	.....	.....	.....	239	196	77.0	83.2	37.4	33.5	44.9	37.5	[f] 32.8	45,900
1913	.....	.....	.....	[g] 479	311	196	79.3	44.0	22.7	52.2	31.2	19.5	63,100
1914	.....	.....	[h] 85.6	220	120	63.2	17.3	14.4	16.7	62.7	35.6	17.7	37,100
1915	12.3	15.2	73.5	84.4	125	264	152	62.9	118	80.4	56.5	43.5	65,700
1916	26.7	390	380	198	262	358	174	86.7	73.5	77.7	56.1	36.1	127,000
1917	25.8	25.7	24.8	431	591	325	84.9	38.3	34.5	39.6	46.1	22.1	102,000
Average	.....	.....	118	243	223	201	89.4	43.1	50.1	50.3	46.1	27.8	.....
Median	.....	.....	73.5	209	229	202	84.0	44.0	34.5	51.8	40.8	22.1	.....
Maximum	.....	.....	380	431	591	378	185	86.7	128	84.5	103	43.5	.....
Minimum	.....	.....	24.8	40.2	51	49	12.6	8.5	4.4	14.3	23.6	17.7	.....

[a] Oct. 1–17.
[b] Mar. 16–31.
[c] Apr. 9–30.
[d] Nov. 1–23.
[e] Apr. 23–30.
[f] Dec. 1–9.
[g] Apr. 13–30.
[h] Mar. 15–31.

NOTE.—Means for periods less than a full month but exceeding 15 days were considered means for the month in finding average and median flow. Averages were not computed for January and February, as the period of record was considered too short. The totals in acre-feet were not averaged because the records covered different periods in different years.

Figures showing maximum and minimum are for full months. The median flow was obtained by arranging the monthly means in their order of magnitude and taking the middle mean, or, if their number was even, the average of the two middle means. By using daily discharge a somewhat lower median discharge would be obtained.

SOUTH FORK OF MILK RIVER AT MACKIE'S RANCH, ALTA.

LOCATION.—In the NW. ¼ sec. 31, T. 1, R. 18 W. fourth meridian.

DRAINAGE AREA.—504 square miles.

RECORDS AVAILABLE.—Practically complete open-water records April 1, 1910, to October 31, 1915, when the station was abandoned and that at Croff's ranch, near the international boundary, was taken up as a joint international station.

GAGE.—Vertical staff; read by Mrs. Nelson.

DISCHARGE MEASUREMENTS.—Made by wading 100 feet below gage or from a cable at gage.

CHANNEL AND CONTROL.—Bed composed of gravel and sand; clean and likely to shift. Right bank low and subject to overflow. One channel at all stages, but at extremely high stages the river overflows a wide area. Control permanent at ordinary stages.

EXTREMES OF DISCHARGE.—1910–1915: Maximum stage recorded, 5.21 feet June 25, 1911 (discharge, 982 second-feet); minimum stage recorded, 1.55 feet August 5–17, 1914 (no discharge).

ICE.—Observations discontinued during winter.

ACCURACY.—Stage-discharge relation fairly permanent. Gage read once daily to hundredths. Rating curves fairly well defined. Records fair.

Discharge measurements of South Fork of Milk River at Mackie's ranch, Alta., 1910–1915.

Date.	Made by—	Gage height.	Discharge.
1910.		*Feet.*	*Sec.-ft.*
Apr. 6	L. J. Gleeson	2.56	79.3
15	do	3.00	172
19	do	2.85	133
29	do	2.90	144
May 3	do	2.72	109
13	do	2.92	155
17	do	2.83	128
27	do	2.71	104
31	do	2.53	74.6
June 10	do	3.23	242
13	do	2.51	72.9
24	do	2.24	40.0
27	do	2.18	37.3
July 8	do	2.03	22.3
21	F. H. Peters	1.75	4.67
30	do	1.64	2.02
Aug. 3	do	1.61	1.44
12	do	1.71	3.50
19	N. M. Sutherland	1.62	1.29
Sept. 11	do	2.21	43.3
17	do	2.05	31.1
25	do	2.17	43.5
28	do	2.14	36.3
Oct. 12	do	2.05	28.6
21	do	2.07	29.4
28	do	2.02	24.2
Nov. 14	do	2.14	35.2
1911.			
Apr. 18	L. J. Gleeson	3.16	210.65
May 5	do	3.10	206.40
12	do	2.96	178.70
20	J. E. Degnan	3.40	301.75
June 9	do	3.14	194.02
July 1	do	3.26	224.39
Aug. 1	do	2.60	83.41
4	do	2.55	75.00
28	do	2.21	34.12
Oct. 16	do	2.46	62.67
1912.			
Apr. 19	do	3.08	170.65
May 15	do	2.84	131.70
June 5	do	2.69	99.15
25	do	2.30	44.26
July 12	do	2.48	70.74
July 30	J. E. Degnan	2.295	42.40
Aug. 17	do	2.10	29.65
Sept. 6	do	2.19	36.30
25	do	2.25	42.65
Oct. 14	do	2.30	47.60
Nov. 6	do	2.255	41.73
1913.			
May 8	do	3.27	243.0
21	do	3.74	402.0
June 9	do	3.11	194.0
28	do	3.58	347.0
July 18	do	2.42	55.9
Aug. 1	do	2.40	52.6
23	do	2.20	32.9
Sept. 11	do	1.97	14.7
26	do	2.24	37.3
28	do	2.18	28.1
Oct. 16	do	2.60	86.1
31	do	2.67	39.4
1914.			
Apr. 8	do	3.38	232.0
May 6	do	2.97	151.0
21	do	2.78	113.0
June 7	do	2.54	77.0
25	do	2.34	49.0
July 21	do	1.82	8.1
Aug. 23	do	1.97	18.3
5	do	1.55	Nil.
Sept. 11	F. R. Steinberger	1.86	9.1
Oct. 14	J. E. Degnan	2.59	81.0
26	do	2.35	44.0
1915.			
Apr. 6	W. H. Storey	2.88	156
27	do	2.37	54
May 25	G. H. Whyte	2.65	95
June 21	W. H. Storey	2.93	157
July 18	do	2.56	78
Aug. 4	do	2.70	112
23	do	2.58	76
Sept. 9	do	2.52	69
29	do	2.61	84
Oct. 18	do	2.69	98

Daily discharge, in second-feet, of South Fork of Milk River at Mackie's ranch, Alta., 1910–1915.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1910.								
1	87.5	120.0	76.0	41.0	1.4	12.5	36.5	35.0
2	89.0	112.0	71.0	34.0	1.0	14.0	35.0	29.0
3	95.0	106.0	65.0	30.0	a 1.4	15.5	35.0	30.5
4	87.5	a 97.0	62.5	27.5	1.6	a 23.5	a 34.0	32.5
5	81.5	a 89.0	69.5	25.5	1.6	a 31.5	33.5	32.5
6	80.0	80.0	67.0	a 25.5	2.0	40.0	30.5	25.0
7	97.0	81.5	64.0	26.5	2.0	44.0	29.0	30.0
8	148.5	81.5	126.5	26.5	2.0	45.5	31.5	35.0
9	148.5	79.0	156.5	25.5	2.0	42.0	30.0	36.5
10	154.0	102.5	242.0	27.5	2.0	39.5	30.5	35.5
11	176.5	102.5	156.5	25.0	3.1	39.5	30.0	35.5
12	236.5	159.5	95.5	22.5	4.2	37.5	28.0	35.5
13	206.0	148.5	76.0	19.5	4.7	35.5	30.0	37.5
14	239.5	128.5	66.0	17.0	4.2	35.0	29.0	53.5
15	176.5	115.5	64.0	15.5	3.5	30.5	28.0	46.5
16	124.5	133.0	60.5	12.5	2.2	29.0	27.5	38.5
17	131.0	138.0	57.5	9.5	1.6	26.5	27.5	39.5
18	131.0	242.0	55.5	8.9	1.6	25.0	26.5	47.5
19	133.0	197.0	53.5	7.3	1.6	22.5	27.5	39.5
20	128.5	173.5	49.5	6.2	3.5	17.0	28.0	44.5
21	165.0	224.5	45.5	6.2	5.8	18.5	29.0	40.0
22	167.5	173.5	45.5	4.7	5.8	17.5	30.0	36.5
23	133.0	131.0	44.0	3.5	4.7	21.0	30.0	39.5
24	115.5	112.0	44.0	2.6	4.7	22.5	27.5	51.5
25	115.5	104.0	42.0	2.2	5.8	30.5	28.0	56.5
26	131.0	102.5	43.0	2.2	5.8	39.5	29.0	31.5
27	135.5	97.0	40.0	2.2	a 8.4	46.5	29.0	30.5
28	135.5	92.0	35.5	2.2	a 11.0	44.5	27.5	.....
29	148.5	83.0	34.0	2.2	14.0	39.5	24.0	.....
30	133.0	77.5	35.0	2.0	12.5	37.5	30.0	.....
31	.....	75.0	.....	1.6	11.5	.....	35.0	.....
1911.								
1	.....	204	196	223	74	34	82	83
2	.....	202	196	217	82	37	74	85
3	.....	203	196	217	63	49	76	83
4	.....	193	184	184	76	55	82	83
5	.....	193	172	182	77	76	92	.....
6	.....	193	196	138	80	408	97	.....
7	.....	199	184	130	76	446	90	.....
8	.....	201	184	100	67	348	88	.....
9	.....	198	196	98	54	326	83	.....
10	.....	204	184	93	53	265	80	.....
11	.....	205	184	83	55	212	78	.....
12	.....	158	196	68	55	165	82	.....
13	.....	202	196	63	62	138	76	.....
14	.....	228	160	56	63	120	76	.....
15	.....	365	116	54	62	107	74	.....
16	.....	660	116	56	60	100	63	.....
17	198	961	124	56	59	109	62	.....
18	224	426	118	60	56	105	60	.....
19	281	333	118	62	56	98	60	.....
20	221	301	116	62	56	93	59	.....
21	279	255	116	60	37	92	59	.....
22	283	250	105	59	39	82	62	.....
23	341	246	100	58	34	76	60	.....
24	281	243	242	58	39	98	64	.....
25	253	226	982	53	30	109	65	.....
26	253	237	853	50	29	100	68	.....
27	255	273	613	48	29	102	72	.....
28	287	269	653	47	34	98	77	.....
29	258	258	363	47	32	97	80	.....
30	202	237	257	44	37	93	78	.....
31	.....	209	.....	58	35	.....	80	.....

a Interpolated.

Daily discharge, in second-feet, of South Fork of Milk River at Mackie's ranch, Alta., 1910–1915—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1912.								
1	.....	161	121	45	42	21	40	45
2	.....	161	105	57	44	21	39	45
3	.....	166	102	56	46	21	39	44
4	.....	163	100	54	52	28	22	42
5	449	163	94	51	54	37	36	41
6	341	161	98	48	57	38	34	39
7	236	153	98	51	59	41	34	39
8	269	149	98	59	54	42	35	41
9	278	161	96	71	52	36	37	39
10	266	159	96	92	47	34	40	41
11	278	157	92	100	45	32	45	42
12	354	157	88	61	42	30	48	45
13	357	151	88	56	37	26	47	44
14	278	128	88	54	35	24	46	44
15	159	124	85	53	35	23	46	45
16	159	122	84	53	32	23	45	43
17	157	122	79	52	29	23	45	.....
18	163	121	79	52	28	22	46	.....
19	174	122	77	52	28	26	47	.....
20	172	124	75	51	27	31	46	.....
21	170	338	74	51	26	35	46	.....
22	168	669	70	56	25	39	47	.....
23	168	549	57	98	25	40	45	.....
24	170	431	51	110	24	41	46	.....
25	170	338	46	105	24	42	46	.....
26	168	298	45	103	23	42	45	.....
27	168	261	45	85	23	42	44	.....
28	170	213	44	58	23	42	46	.....
29	166	163	44	48	23	41	47	.....
30	166	153	44	46	22	40	47	.....
31	.....	137	.....	45	21	.....	46	.....
1913.								
1	.....	332	359	359	53	17.6	30.0	.....
2	.....	291	352	318	53	17.6	30.0	.....
3	.....	262	335	278	52	16.8	30.0	.....
4	.....	236	298	220	39	16.8	31.0	.....
5	.....	208	278	188	45	16.0	34.0	.....
6	150	185	262	158	43	16.0	45.0	.....
7	160	188	242	138	43	14.8	47.0	.....
8	170	242	230	123	58	10.6	53.0	.....
9	200	246	194	106	75	9.6	55.0	.....
10	300	242	185	87	102	9.6	67.0	.....
11	400	226	180	66	106	14.2	70.0	.....
12	500	220	177	62	94	14.2	70.0	.....
13	900	284	171	60	97	13.6	72.0	.....
14	900	318	171	58	104	13.0	87.0	.....
15	800	352	166	57	99	13.0	140.0	.....
16	700	431	163	57	83	13.0	92.0	.....
17	600	388	158	55	63	13.0	79.0	.....
18	554	392	150	55	42	13.6	76.0	.....
19	550	456	155	54	41	14.2	72.0	.....
20	546	456	153	53	38	13.6	72.0	.....
21	539	402	150	52	36	14.2	65.0	.....
22	539	392	134	52	35	16.0	69.0	.....
23	532	384	114	49	32	25.0	67.0	.....
24	464	381	106	48	30	27.0	72.0	.....
25	446	384	110	48	28	30.0	73.0	.....
26	413	388	113	47	26	36.0	69.0	.....
27	374	392	153	46	25	31.0	63.0	.....
28	366	410	370	46	23	31.0	58.0	.....
29	370	406	420	55	21	30.0	52.0	.....
30	366	399	424	55	20	30.0	47.0	.....
31	.....	388	.....	54	18	.....	39.0	.....

Daily discharge, in second-feet, of South Fork of Milk River at Mackie's ranch, Alta., 1910–1915—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1914.								
1	.....	.....	64	40.0	1.0	9.6	7.2	.....
2	.....	.....	61	33.0	1.2	9.2	11.8	.....
3	.....	.....	60	31.0	.4	8.4	23.0	.....
4	341	.....	60	27.0	.6	6.4	39.0	.....
5	246	.....	62	27.0	0	8.0	44.0	.....
6	436	156	68	25.0	0	8.0	54.0	.....
7	298	.....	74	28.0	0	6.4	26.0	.....
8	249	.....	76	30.0	0	7.6	22.0	.....
9	250	.....	62	27.0	0	7.6	23.0	.....
10	227	.....	61	22.0	0	7.2	26.0	.....
11	.....	.....	54	20.0	0	8.8	53.0	.....
12	.....	.....	51	17.0	.6	12.4	51.0	.....
13	.....	.....	60	16.2	0	12.4	65.0	.....
14	.....	.....	59	15.4	0	11.2	81.0	.....
15	.....	.....	131	17.0	0	17.8	102.0	.....
16	.....	.....	100	13.0	0	19.4	212.0	.....
17	.....	.....	76	11.2	0	17.0	215.0	.....
18	.....	.....	61	9.6	34.0	14.6	184.0	.....
19	.....	.....	50	9.2	28.0	17.0	153.0	.....
20	.....	105	43	8.8	39.0	17.8	115.0	.....
21	.....	115	39	6.4	29.0	19.4	95.0	.....
22	.....	140	30	6.0	19.4	14.6	100.0	.....
23	.....	119	33	4.8	14.6	13.8	78.0	.....
24	.....	107	31	3.8	16.2	13.0	67.0	.....
25	.....	100	47	3.6	17.0	11.8	51.0	.....
26	.....	92	47	3.2	20.0	10.0	49.0	.....
27	.....	89	74	3.0	29.0	9.2	45.0	.....
28	.....	82	68	2.6	24.0	8.8	44.0	.....
29	.....	78	50	2.0	17.0	8.4	43.0	.....
30	.....	74	43	1.0	16.2	7.6	41.0	.....
31	.....	68	.....	.6	11.2	.....	39.0	.....
1915.								
1	60	42	53	126	117	31	82	.....
2	70	252	56	170	167	49	74	.....
3	103	212	60	165	131	173	76	.....
4	124	214	662	220	103	462	94	.....
5	136	126	603	170	81	397	112	.....
6	156	115	499	136	63	148	108	.....
7	[a] 117	110	313	192	53	97	103	.....
8	103	105	220	126	48	92	119	.....
9	101	88	195	94	42	71	119	.....
10	97	82	192	86	38	90	126	.....
11	76	70	244	90	61	206	101	.....
12	70	67	189	82	51	165	119	.....
13	73	86	151	68	47	181	117	.....
14	73	88	146	67	42	173	112	.....
15	82	267	170	68	41	151	101	.....
16	86	288	192	74	48	131	101	.....
17	82	232	235	71	48	124	108	.....
18	78	226	189	78	45	97	101	.....
19	76	186	181	377	47	88	88	.....
20	70	175	170	165	61	92	78	.....
21	70	146	159	117	58	95	78	.....
22	67	131	151	88	49	94	78	.....
23	65	110	124	81	81	82	78	.....
24	63	105	138	76	73	82	78	.....
25	58	94	124	63	65	81	78	.....
26	55	84	858	95	49	97	78	.....
27	51	81	455	235	45	94	78	.....
28	50	73	390	261	38	81	76	.....
29	47	65	206	255	37	84	76	.....
30	40	56	151	241	33	86	74	.....
31	.....	59	.....	165	31	.....	74	.....

[a] Interpolated.

NOTE.—1911: Gage carried out Mar. 22 and reestablished Apr. 17. Ice present Nov. 4.
1912: Ice present until Apr. 4.
1913: Stage-discharge relation affected by ice Apr. 6–17; discharge estimated. Shifting control Oct. 26–31.
1914: Ice present, control affected, Apr. 4. No gage record Apr. 11 to May 5 and May 7–19. No flow Aug. 5–12 and Aug. 13–17.

Monthly discharge of South Fork of Milk River at Mackie's ranch, Alta., 1910–1915.

[Drainage area, 504 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1910.						
April	239.5	80.0	137.7	0.312	0.348	8,195
May	242.0	75.0	121.2	.275	.317	7,452
June	242.0	34.0	71.4	.162	.181	4,248
July	41.0	1.6	15.0	.034	.039	922
August	14.0	1.0	4.43	.010	.012	272
September	46.5	12.5	30.8	.070	.081	1,833
October	36.5	24.0	29.9	.068	.078	1,838
November 1–27	56.5	25.0	37.98	.086	.086	2,033
The period					1.142	26,793
1911.						
April 17–30	341	198	258	.585	.30	7,172
May	961	158	275	.624	.72	16,909
June	982	100	254	.576	.64	15,114
July	223	44	90	.204	.24	5,534
August	82	29	54	.122	.14	3,320
September	446	34	141	.320	.36	8,390
October	97	59	74	.168	.19	4,550
November 1–3	85	83	84	.190	.01	550
The period					2.60	61,539
1912.						
April 5–30	449	157	222	.503	.49	11,453
May	669	121	209	.474	.55	12,851
June	121	44	78.8	.179	.20	4,689
July	110	45	63.6	.144	.17	3,911
August	59	21	35.6	.081	.09	2,189
September	42	21	32.8	.074	.08	1,952
October	48	22	42.6	.097	.11	2,619
November 1–16	45	39	42.4	.096	.06	1,347
The period					1.75	41,011
1913.						
April 6–30	900	150	474.0	1.074	.91	21,323
May	456	185.0	332.0	.753	.87	20,414
June	424	106.0	216.0	.490	.55	12,853
July	359	46.0	100.0	.227	.26	6,148
August	106	18.0	51.3	.118	.14	3,216
September	36	9.6	18.4	.042	.05	1,095
October	140	30	68.4	.155	.18	4,206
The period					2.96	69,255
1914.						
Apr. 4–10	436.0	227.0	292.0	.579	.15	4,060
May 6, 20–31	156.0	68.0	102.0	.202	.10	2,608
June	131.0	30.0	60.0	.119	.13	3,570
July	40.0	0.6	15.0	.030	.04	922
August	39.0	0	10.3	.020	.02	633
September	19.4	6.4	11.4	.023	.03	678
October	215.0	7.2	70.0	.139	.16	4,304
The period					0.63	16,775
1915.						
April	156	40	80	.159	.18	4,760
May	288	42	130	.258	.30	7,993
June	858	53	249	.494	.55	14,817
July	377	63	139	.276	.32	8,547
August	167	31	61	.121	.14	3,751
September	462	31	130	.258	.29	7,736
October	126	74	93	.185	.21	5,718
The period					1.99	53,322

Mean monthly discharge, in second-feet, of South Fork of Milk River at Mackie's ranch, Alta., 1910–1915.

Year.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total in acre-feet.
1910	138	121	71	15	4	31	30	[a] 38	27,021
1911	[b] 258	275	254	90	54	141	74	[b] 84	61,539
1912	[c] 252	209	79	64	36	33	43	[a] 42	45,705
1913	[c] 400	332	216	100	51	18	62	.....	71,340
1914	[b] 292	[b] 102	60	15	10	11	70	.....	[b] 16,775
1915	80	130	249	139	61	130	93	.....	53,322
Average	218	213	155	70	36	61	62	40	51,785
Average run-off, acre-feet	12,972	13,097	9,223	4,304	2,214	3,630	3,812	2,380	51,632
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	102

[a] Average for part of month assumed as monthly mean.
[b] Incomplete record not included in average.
[c] Estimated.

MILK RIVER AT MILK RIVER, ALTA.

LOCATION.—In the NE. ¼ sec. 21, T. 2, R. 16 W. fourth meridian, at Milk River station, Alberta. (See Pl. X, *A*.)

DRAINAGE AREA.—1,104 square miles.

RECORDS AVAILABLE.—Open-water records July 1, 1909, to December 31, 1911; complete records January 1, 1912, to December 31, 1917.

GAGE.—Vertical staff used from establishment of station until February 16, 1916, when a new box chain gage was placed on railway bridge. Zero of gage maintained at elevation 3,403.39 feet above sea level (Geodetic Survey of Canada). Observer, Dan O'Connell.

DISCHARGE MEASUREMENTS.—Made by wading or from traffic bridge 100 feet above gage.

CHANNEL AND CONTROL.—Bed of stream composed of quicksand and gravel; clean and shifting. Right bank high, clean, and subject to overflow at extremely high water only: left bank low. Two channels at very low water. Control not permanent.

EXTREMES OF DISCHARGE.—1909–1917: Maximum stage recorded, 8.50 feet February 17, 1916 (discharge, 3,467 second-feet); minimum stage, 1.75 feet February 9, 1914 (discharge, 1.0 second-foot). (See hydrograph, Pl. XI.)

ICE.—Stage-discharge relation affected by ice during winter season.

REGULATION.—Flow at this station was affected in 1917 by diversion of water from St. Mary River to Milk River by the United States Reclamation Service.

ACCURACY.—Stage-discharge relation not permanent. Gage read to hundredths daily. Daily discharge for open-water periods obtained by applying daily gage height to rating table; winter discharge ascertained from hydrograph based on daily gage heights, discharge measurements, and records of temperature. Records fair.

A.GAGING STATION OF CANADIAN RECLAMATION SERVICE ON MILK RIVER, AT MILK RIVER, ALBERTA.

B. INTERNATIONAL GAGING STATION ON MILK RIVER AT EASTERN CROSSING.

Discharge measurements of Milk River at Milk River, Alta., 1910–1917.

Date.	Made by—	Gage height.	Discharge.
1910.		*Feet.*	*Sec.-ft.*
Apr. 18	L. J. Gleeson	1.72	179
May 2	do	1.74	180
10	F. H. Peters	1.55	136
16	L. J. Gleeson	1.80	189
28	do	1.62	137
30	N. M. Sutherland	1.50	122
June 11	L. J. Gleeson	2.00	236
13	do	1.52	125
21	N. M. Sutherland	1.25	79.2
25	L. J. Gleeson	1.18	64.6
27	do	1.18	63.0
July 4	N. M. Sutherland	1.08	47.2
9	L. J. Gleeson	1.05	40.3
18	N. M. Sutherland	.86	22.9
21	F. H. Peters	.83	20.9
Aug. 1	do	.73	13.1
10	N. M. Sutherland	.76	16.6
16	F. H. Peters	.76	19.7
22	L. J. Gleeson	.74	17.2
Sept. 12	G. H. Whyte	1.19	65.0
26	do	1.09	57.4
Oct. 10	do	1.02	42.8
21	N. M. Sutherland	1.05	52.9
29	do	1.06	57.2
31	do	1.06	52.2
Nov. 4	G. H. Whyte	1.045	43.9
4	do	1.055	45.3
1911.			
Apr. 14	L. J. Gleeson	2.04	258.60
May 2	N. McL. Sutherland	1.85	223.81
7	L. J. Gleeson	2.26	358.65
17	N. McL. Sutherland	4.72	1,692.23
22	J. E. Degnan	2.10	263.82
June 13	do	1.70	162.00
28	do	2.70	512.00
July 5	do	1.74	175.45
29	do	1.20	75.12
Aug. 10	do	1.73	172.60
30	do	1.22	66.78
Sept. 7	do	3.24	783.48
8	do	2.88	667.15
9	do	2.83	643.38
15	do	1.63	147.70
Oct. 14	do	1.53	113.58
20	do	1.53	112.48
Nov. 10	L. J. Gleeson and D. D. Macleod	1.45	68.59
Dec. 7	D. D. Macleod	2.28	[a]119.80
29	do	2.25	[a]47.97
1912.			
Jan. 23	do	3.17	35.71
Feb. 10	do	3.60	73.60
23	do	3.53	81.10
Mar. 9	do	3.07	55.20
Apr. 3	do	.....	1,090.02
16	J. E. Degnan	2.25	316.59
22	do	2.20	288.82
May 13	do	1.98	206.56
16	do	1.92	204.57
June 4	do	1.85	157.12
8	do	1.72	137.44
26	do	1.35	66.72
July 6	do	1.64	116.30
15	do	1.61	111.61
Aug. 2	do	1.41	64.13
15	do	1.35	57.60
19	do	1.51	82.90
Sept. 5	do	1.38	60.26
10	do	1.37	60.25
21	do	1.57	85.20
26	do	1.53	86.04
Oct. 12	do	1.54	85.90
16	do	1.53	85.25
Nov. 5	do	1.57	92.11
1913.		*Feet.*	*Sec.-ft.*
Jan. 27	G. F. Deas	2.32	7.0
Feb. 11	do	2.30	10.6
27	do	3.55	7.4
Apr. 11	J. E. Degnan	4.60	1,102.0
14	do	4.92	1,870.0
21	do	3.29	825.0
May 9	do	2.32	321.0
21	do	3.03	625.0
22	do	2.69	455.0
June 8	do	2.04	250.0
11	do	1.98	245.0
26	do	1.78	173.0
30	do	2.71	495.0
July 15	do	1.45	109.0
20	do	1.32	88.0
Aug. 1	do	1.28	84.0
2	do	1.31	82.0
20	do	1.32	76.0
21	do	1.18	50.1
Sept. 10	do	1.10	33.1
13	do	1.09	34.0
24	do	1.18	52.0
29	do	1.27	54.0
Oct. 15	do	1.88	175.0
18	do	1.48	89.0
Nov. 1	do	1.41	85.0
13	do	1.755	57.0
Dec. 1	do	1.43	56.0
11	do	1.59	33.0
22	do	1.38	11.0
1914.			
Jan. 19	do	2.05	33.00
31	do	1.92	11.30
Feb. 16	do	2.42	3.38
Mar. 3	do	3.27	43.00
Apr. 6	do	3.475	844.00
11	do	2.42	349.00
14	do	2.82	569.00
May 5	do	2.01	216.00
7	do	2.02	222.00
19	do	1.63	125.00
23	do	1.84	166.00
June 6	do	1.42	86.00
8	do	1.48	95.00
23	do	1.12	42.00
27	do	1.34	69.00
July 20	do	.82	18.00
23	do	.78	15.90
Aug. 4	do	.59	5.40
7	do	.60	5.18
22	do	1.14	44.10
24	do	1.11	34.00
Sept. 14	F. R. Steinberger	1.00	29.00
10	do	.87	20.00
Oct. 10	J. E. Degnan	1.45	69.00
12	do	1.53	92.00
25	do	1.56	91.00
Nov. 9	O. H. Hoover	1.45	91.00
23	do	1.60	58.00
Dec. 8	do	1.54	29.00
24	do	2.09	19.60
1915.			
Jan. 11	do	2.25	29
25	J. E. Degnan	2.33	22
Feb. 11	do	2.80	24
Mar. 2	do	3.07	30
10	do	2.89	42
15	W. H. Storey	3.02	46
Apr. 5	do	2.51	440
7	do	2.04	250
26	do	1.47	90
29	do	1.28	71
May 26	G. H. Whyte and W. H. Storey	1.62	132

[a] Ice present.

Discharge measurements of Milk River at Milk River, Alta., 1910–1917—Continued.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
June 18	W. H. Storey	2.31	324	June 23	J. E. Degnan	3.09	[b]815.0
28	J. E. Degnan	2.80	519	July 19	W. A. Burton	2.01	306.0
July 17	W. H. Storey	1.78	187	Aug. 10	S. H. Frame	2.91	610.0
19	do	3.13	677	31	do	1.56	169.0
Aug. 3	do	2.10	276	Oct. 12	do	1.81	219.0
5	do	1.85	189	Dec. 5	H. W. Rowley	[a]2.09	115.0
24	do	1.68	147	26	do	[a]2.46	73.0
Sept. 6	do	2.42	381				
7	do	1.98	224	1917.			
13	do	2.10	272	Jan. 17	do	2.85	59
28	do	1.76	164	Feb. 13	W. A. Burton	3.35	66
Oct. 16	do	1.94	210	26	G. S. Wenden	3.58	68
18	do	1.87	199	Mar. 21	do	3.67	63
Nov. 3	do	1.77	152	Apr. 9	J. E. Degnan	6.25	3,274
20	do	2.18	104	13	do	4.83	2,146
Dec. 14	do	2.00	61	19	A. W. P. Lowrie	2.48	444
				May 16	do	3.30	917
1916.				June 9	do	2.35	431
Jan. 4	do	[a]2.30	34.0	25	do	2.05	346
Feb. 1	V. A. Newhall	[a]3.10	12.6	July 17	do	2.14	381
18	G. H. Whyte	8.06	3,323.0	Aug. 2	do	2.12	333
19	do	7.04	1,944.0	22	do	2.14	343
Mar. 6	L. J. Gleeson	[a]3.29	50.0	Sept. 12	do	2.13	341
22	S. H. Frame	2.96	602.0	Oct. 2	do	1.18	77
Apr. 12	do	2.21	361.0	Nov. 5	do	1.65	174
May 10	do	2.08	306.0	23	S. H. Frame	1.25	80
30	do	3.14	893.0	Dec. 14	D. G. Chadsey	[a]1.92	34
June 20	W. A. Burton	2.32	403.0	24	S. H. Frame	[a]2.15	48

[a] Ice present.

[b] Discharge estimated by surface velocities.

Daily discharge, in second-feet, of Milk River at Milk River, Alta., 1909–1917.

Day.	July.	Aug.	Sept.	Oct.	Nov.	Day.	July.	Aug.	Sept.	Oct.	Nov.
1909.						16	178	96	96	80	166
1	289	370	83	64	70	17	158	96	86	80	166
2	258	294	83	56	70	18	150	96	83	80	190
3	248	250	83	56	70	19	140	96	83	80	194
4	247	222	83	56	70	20	125	86	83	80	.....
5	256	192	83	56	67	21	122	83	83	77	.....
6	260	160	83	56	77	22	122	83	83	77	.....
7	282	152	83	62	80	23	122	76	83	87	.....
8	428	152	76	63	80	24	104	72	83	89	.....
9	346	152	65	63	108	25	96	72	83	79	.....
10	274	152	58	70	108	26	133	72	83	73	.....
11	260	140	56	72	108	27	232	72	83	73	.....
12	238	126	56	72	166	28	800	72	76	73	.....
13	210	122	66	72	166	29	1,344	72	72	73	.....
14	204	112	82	82	166	30	1,000	72	65	73	.....
15	186	98	93	80	166	31	464	82	.....	73	.....

Daily discharge, in second-feet, of Milk River at Milk River, Alta., 1909–1917—Contd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1910.												
1	.....	.....	.....	130.0	169.5	101.5	51.0	13.0	34.5	63.0	72.5	.....
2	.....	.....	.....	173.5	169.5	101.5	52.0	13.0	33.0	58.5	64.0	.....
3	.....	.....	.....	173.5	169.5	101.5	50.0	13.0	33.0	57.0	53.0	.....
4	.....	.....	.....	173.5	169.5	101.5	48.5	13.5	42.0	46.5	49.5	.....
5	.....	.....	.....	173.5	151.5	101.5	46.5	13.5	48.0	51.5	.....	.....
6	.....	.....	.....	173.5	147.0	101.5	43.5	13.5	50.5	50.0	.....	.....
7	.....	.....	.....	173.5	127.0	88.5	40.0	14.5	75.5	50.0	.....	.....
8	.....	.....	.....	204.0	125.0	96.0	37.0	17.0	83.5	46.0	.....	.....
9	.....	.....	.....	221.0	108.5	101.5	35.5	18.0	79.0	45.5	.....	.....
10	.....	.....	.....	199.5	151.0	304.0	37.5	18.0	76.5	45.5	.....	.....
11	.....	.....	.....	238.5	169.5	211.5	36.5	18.5	74.0	47.5	.....	.....
12	.....	.....	.....	264.0	205.0	152.5	35.5	18.5	68.0	48.0	.....	.....
13	.....	.....	.....	254.5	214.0	122.0	36.5	21.0	65.0	48.5	.....	.....
14	.....	.....	.....	245.0	201.0	122.5	35.0	20.5	61.5	49.0	.....	.....
15	.....	.....	.....	260.5	175.0	104.0	34.5	22.0	59.5	47.0	.....	.....
16	.....	.....	.....	247.0	202.5	90.0	33.0	23.0	54.0	48.5	.....	.....
17	.....	.....	.....	195.0	210.5	86.5	32.5	21.0	51.5	49.0	.....	.....
18	.....	.....	.....	197.5	226.5	87.0	31.0	21.0	45.0	51.0	.....	.....
19	.....	.....	.....	201.5	252.0	87.5	27.0	22.0	41.5	51.5	.....	.....
20	.....	.....	.....	220.5	248.5	81.0	22.5	20.5	38.5	54.0	.....	.....
21	.....	.....	.....	219.5	250.0	79.0	21.5	19.5	41.5	57.5	.....	.....
22	.....	.....	.....	219.5	235.0	78.5	20.0	20.0	42.0	54.5	.....	.....
23	.....	.....	.....	210.0	196.0	71.0	18.5	22.0	40.0	53.5	.....	.....
24	.....	.....	.....	206.5	165.5	68.5	17.5	22.0	50.5	54.0	.....	.....
25	.....	.....	.....	179.0	157.5	68.0	17.0	22.5	57.0	50.5	.....	.....
26	.....	.....	.....	172.0	156.5	67.5	15.0	26.5	60.5	51.0	.....	.....
27	.....	.....	.....	187.0	155.5	54.0	14.5	27.0	63.0	68.0	.....	.....
28	.....	.....	.....	194.0	139.0	50.5	14.5	31.0	63.0	110.5	.....	.....
29	.....	.....	.....	203.0	117.0	50.5	14.0	34.0	59.5	54.0	.....	.....
30	.....	.....	.....	195.0	124.0	51.0	13.5	34.0	62.5	54.5	.....	.....
31	.....	.....	.....	.....	106.0	.....	14.5	34.5	.....	56.5	.....	.....
1911.												
1	.....	.....	.....	426	228	244	401	90	56	131	147	121
2	.....	.....	.....	227	224	233	365	122	50	125	159	120
3	.....	.....	.....	227	224	224	272	103	61	125	171	125
4	.....	.....	.....	200	224	241	233	112	120	144	184	124
5	.....	.....	.....	162	267	224	176	110	422	172	208	122
6	.....	.....	.....	200	303	213	164	114	927	156	205	121
7	.....	.....	.....	111	321	208	146	146	927	142	169	120
8	.....	.....	.....	200	358	200	120	176	730	131	95	120
9	.....	.....	.....	200	255	178	126	166	653	123	85	119
10	.....	.....	.....	200	252	250	112	152	427	120	69	115
11	.....	.....	.....	507	252	200	103	126	303	116	81	112
12	.....	.....	.....	402	240	174	99	120	236	112	80	97
13	.....	.....	.....	288	237	159	96	112	200	112	81	67
14	.....	.....	.....	253	240	152	90	101	160	112	84	65
15	.....	.....	.....	230	501	143	85	85	148	120	93	64
16	.....	.....	.....	204	1,326	133	83	77	123	107	111	68
17	.....	.....	.....	232	1,884	135	83	70	131	103	136	66
18	.....	.....	.....	249	710	128	82	66	135	107	132	62
19	.....	.....	.....	299	521	120	101	56	150	107	128	63
20	.....	.....	.....	282	422	105	120	56	138	107	123	50
21	.....	.....	.....	318	272	101	109	56	131	109	121	47
22	.....	.....	.....	485	272	120	99	56	134	107	122	47
23	.....	.....	.....	589	272	141	94	56	138	112	120	48
24	.....	.....	.....	449	298	253	87	56	149	107	122	45
25	.....	.....	.....	368	301	945	87	62	153	107	121	47
26	.....	.....	.....	454	312	2,049	90	61	172	89	128	46
27	.....	.....	.....	457	365	1,090	83	62	177	73	126	47
28	.....	.....	.....	414	342	489	69	62	152	116	125	51
29	.....	.....	.....	338	350	422	69	66	134	125	123	48
30	.....	.....	.....	265	288	389	69	69	132	136	122	47
31	.....	.....	.....	.....	247	.....	68	62	.....	147	.....	49

Daily discharge, in second-feet, of Milk River at Milk River, Alta., 1909–1917—Contd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1912.												
1	47	66	70	.....	233	214	108	61	48	73	85	.....
2	44	68	66	.....	225	197	174	61	47	63	85	.....
3	44	73	64	1,504	222	180	180	65	48	59	89	.....
4	43	72	64	1,134	222	162	180	80	48	65	105	.....
5	39	72	63	1,074	244	150	133	87	53	80	93	.....
6	34	74	56	790	233	136	105	94	63	72	96	.....
7	33	75	54	684	214	136	139	87	66	63	98	.....
8	33	76	54	658	214	133	122	75	72	68	98	.....
9	24	73	52	658	214	122	117	72	78	75	85	.....
10	19	74	52	658	252	110	214	72	66	89	110	.....
11	12	76	52	658	272	105	180	63	59	87	105	.....
12	40	76	52	608	233	96	122	58	58	91	105	.....
13	38	76	59	a529	204	94	105	56	51	103	136	.....
14	53	78	62	a454	197	94	130	53	51	94	150	.....
15	52	78	62	a384	187	98	103	53	48	91	130	.....
16	44	78	62	316	187	105	103	55	48	87	110	.....
17	42	86	59	292	190	103	98	55	49	85	110	.....
18	40	86	56	288	190	98	89	55	49	80	110	.....
19	39	86	56	312	197	98	80	82	55	84	142	.....
20	36	88	56	304	194	89	85	66	56	84	.....	.....
21	36	88	70	304	252	77	98	66	66	80	60	.....
22	34	84	78	292	1,104	73	165	60	73	80	75	.....
23	33	80	93	272	900	63	214	58	91	77	80	.....
24	35	80	139	252	628	56	156	58	91	80	98	.....
25	35	80	436	229	354	56	142	51	89	80	105	.....
26	36	78	528	252	292	58	128	48	85	80	.....	.....
27	37	78	676	252	292	58	120	48	84	80	.....	.....
28	38	74	852	252	252	59	98	48	85	89	.....	.....
29	40	69	.....	241	233	61	84	48	85	89	.....	.....
30	40	.....	.....	233	233	77	72	48	80	89	.....	.....
31	48	.....	.....	.....	214	.....	60	48	.....	98	.....	.....
1913.												
1	7.0	8.2	7.0	77	308	376	337	74	39	41	82	57
2	7.0	8.6	7.0	150	305	376	257	74	44	32	92	56
3	7.0	8.9	7.0	100	311	340	198	64	38	35	85	64
4	7.0	9.1	7.0	200	314	334	177	54	36	46	83	48
5	7.0	9.4	7.0	190	314	308	155	70	33	61	92	46
6	7.0	9.6	7.0	410	292	292	148	54	39	63	94	56
7	7.0	9.8	7.0	570	289	276	144	46	34	78	87	38
8	7.0	10.1	7.0	650	295	238	131	54	33	63	69	a 38
9	7.0	10.3	7.0	730	311	230	118	76	31	69	71	38
10	7.0	10.6	7.0	1,100	289	227	114	124	33	74	67	42
11	7.0	10.6	7.0	1,140	276	227	114	144	34	76	74	33
12	7.0	9.2	7.0	1,380	334	227	110	167	34	a 101	73	33
13	7.0	9.0	7.0	1,838	434	222	110	114	28	a 129	52	40
14	7.0	8.8	7.0	1,888	434	208	114	94	33	a 156	48	41
15	7.0	8.6	7.0	1,490	410	196	100	92	31	185	35	47
16	7.0	8.4	7.0	1,259	414	184	88	88	34	a 152	a 35	47
17	7.0	8.1	7.0	1,219	a 454	172	86	90	34	a 121	a 35	47
18	7.0	7.9	7.0	896	a 498	167	84	84	34	92	a 35	40
19	7.0	7.7	7.0	801	544	157	82	a 80	35	87	a 34	29
20	7.0	7.5	7.0	864	782	172	74	76	33	89	a 33	19
21	7.0	7.3	7.0	832	606	191	74	76	39	87	a 33	15
22	7.1	7.1	7.0	807	450	211	84	74	50	85	a 34	12
23	7.2	7.8	7.0	679	450	191	74	64	47	83	33	21
24	7.3	7.6	7.0	458	476	167	70	54	50	83	28	18
25	7.4	7.4	7.0	422	454	172	70	54	69	80	32	40
26	7.5	7.2	7.0	394	446	169	68	44	74	78	62	47
27	7.6	7.4	7.0	380	458	244	78	44	61	96	81	65
28	7.7	7.0	7.0	549	498	434	94	39	58	94	75	88
29	7.8	.....	7.0	476	507	525	110	36	53	80	74	58
30	7.9	.....	7.0	394	476	434	124	36	47	74	72	77
31	8.0	.....	7.0	.....	426	.....	74	36	.....	105	.....	102

a Interpolated.

Daily discharge, in second-feet, of Milk River at Milk River, Alta., 1909–1917—Contd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1914.												
1	20.0	10.7	38	242	157	72	53.0	6.8	29.0	21	72	57.0
2	22.0	9.2	40	278	172	70	48.0	6.3	26.0	24	76	54.0
3	20.0	7.0	43	314	175	64	44.0	5.8	25.0	38	80	43.0
4	21.0	7.3	45	349	175	64	40.0	4.9	21.0	83	81	37.0
5	22.0	7.8	46	349	215	68	43.0	5.4	24.0	184	84	34.0
6	23.0	6.3	47	912	188	84	38.0	4.0	23.0	240	95	31.0
7	24.0	4.4	48	614	215	87	36.0	4.0	24.0	124	114	30.0
8	25.0	2.0	50	388	245	94	37.0	5.4	30.0	81	92	29.0
9	24.0	1.0	51	311	221	80	38.0	6.3	23.0	79	91	28.0
10	24.0	2.2	47	475	201	72	36.0	10.3	24.0	61	84	28.0
11	24.0	4.0	46	388	188	64	33.0	9.8	23.0	61	72	28.0
12	25.0	5.8	45	388	175	64	30.0	10.8	29.0	81	70	28.0
13	26.0	7.0	47	734	162	72	27.0	10.3	32.0	89	80	30.0
14	26.0	7.5	53	572	139	72	24.0	9.2	32.0	96	74	28.0
15	27.0	4.0	59	368	135	80	25.0	8.7	35.0	134	66	26.0
16	28.0	3.4	65	277	126	146	27.0	16.7	36.0	393	62	25.0
17	29.0	4.0	71	277	122	98	26.0	14.9	35.0	389	57	23.0
18	30.0	5.2	77	245	122	74	21.0	14.3	32.0	320	57	22.0
19	33.0	7.5	83	188	124	64	20.0	48.0	32.0	274	58	21.0
20	34.0	10.0	89	162	139	57	18.7	50.0	32.0	218	59	20.0
21	35.0	13.0	131	152	139	44	16.1	43.0	32.0	198	58	21.0
22	32.0	12.0	173	230	162	41	14.9	44.0	30.0	144	58	22.0
23	30.0	11.0	215	175	150	43	13.7	44.0	30.0	115	58	21.0
24	28.0	15.0	192	150	128	44	12.5	40.0	29.0	100	60	19.6
25	28.0	18.0	169	175	118	56	11.4	36.0	27.0	87	100	19.5
26	26.0	23.0	146	196	110	64	9.2	36.0	27.0	87	138	20.0
27	23.0	29.0	123	162	98	67	6.3	38.0	24.0	82	150	21.0
28	20.0	34.0	100	150	98	100	8.2	44.0	24.0	82	122	23.0
29	21.0	.....	136	150	94	78	8.2	36.0	24.0	78	89	25.0
30	18.5	.....	171	139	87	58	6.8	33.0	24.0	76	34	26.0
31	11.3	.....	207	.....	80	.....	7.7	30.0	.....	76	.....	28.0
1915.												
1	29	21	31	138	77	77	270	277	85	169	163	85
2	29	22	31	304	100	77	304	339	113	158	169	84
3	30	22	31	386	304	115	339	270	222	177	174	82
4	30	24	32	684	270	375	297	237	948	206	177	81
5	30	25	32	432	222	1,080	353	191	492	237	177	80
6	29	26	34	322	167	1,014	270	163	270	231	177	79
7	29	26	35	273	177	684	253	140	200	222	177	78
8	28	26	38	206	150	412	253	131	164	222	177	77
9	28	26	41	180	122	336	222	126	158	237	126	76
10	28	25	42	164	108	287	191	117	150	244	138	73
11	29	25	43	150	95	575	189	115	206	206	131	71
12	29	25	44	126	91	357	177	138	280	215	124	68
13	31	27	45	104	100	304	161	124	277	222	117	64
14	31	27	46	126	115	270	153	113	253	222	110	61
15	30	28	47	126	218	287	150	115	253	206	106	59
16	30	29	50	126	428	343	150	113	228	218	102	59
17	29	29	74	126	368	357	169	119	206	222	100	59
18	27	29	260	115	412	332	189	113	189	191	100	59
19	25	28	600	113	284	451	671	115	177	186	102	58
20	22	28	900	111	277	439	371	206	166	177	104	57
21	21	28	900	117	225	318	247	222	177	169	103	56
22	22	28	1,200	115	194	237	187	150	177	177	100	55
23	22	30	1,050	113	158	206	164	150	164	172	97	53
24	22	30	800	111	155	197	161	143	161	158	95	52
25	22	31	300	95	140	237	164	150	169	169	92	50
26	22	31	230	96	131	1,234	191	115	177	150	89	48
27	22	31	234	72	126	904	191	106	177	150	85	47
28	21	31	131	69	108	596	346	96	164	158	81	45
29	21	.....	203	62	93	512	404	95	169	164	83	44
30	21	.....	174	66	87	339	567	91	172	164	85	42
31	21	.....	161	.....	77	.....	393	87	.....	164	.....	40

Daily discharge, in second-feet, of Milk River at Milk River, Alta., 1909–1917—Contd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1916.												
1	38.0	12.6	310	341	341	854	870	167	133	139	200	118
2	36.0	12.8	250	407	344	840	730	164	128	146	203	117
3	35.0	13.2	180	472	456	845	620	154	185	164	188	116
4	34.0	13.8	120	374	358	685	580	141	410	172	200	116
5	33.0	14.0	54	325	358	630	550	138	763	162	203	115
6	33.0	14.2	50	292	374	735	475	141	534	206	206	114
7	32.0	15.0	140	286	341	705	435	141	338	282	185	113
8	31.0	17.0	280	292	315	573	467	141	263	282	177	112
9	31.0	20.0	420	358	348	542	445	240	300	273	171	110
10	29.0	24.0	1,306	358	300	500	420	593	232	246	164	109
11	24.0	40.0	1,829	374	325	634	372	508	223	230	157	108
12	22.0	160.0	1,583	364	300	760	367	361	200	233	152	106
13	21.0	290.0	1,224	384	320	595	333	282	183	246	148	104
14	20.0	420.0	864	341	335	490	290	224	185	230	144	102
15	20.0	550.0	636	341	353	470	275	263	187	215	142	100
16	20.0	680.0	619	384	367	427	255	218	190	218	139	98
17	21.0	3,467.0	668	358	420	395	280	194	182	221	137	95
18	22.0	3,346.0	521	315	368	395	292	209	173	203	134	92
19	24.0	1,940.0	537	299	365	385	306	299	163	197	133	87
20	25.0	1,842.0	554	309	372	403	282	328	151	203	131	81
21	24.0	1,583.0	603	292	360	555	240	240	141	215	129	78
22	23.0	1,335.0	609	276	393	680	188	224	139	230	127	76
23	22.0	1,204.0	505	286	443	815	172	209	135	246	126	75
24	21.0	1,074.0	423	276	533	840	188	194	132	230	124	74
25	20.0	1,012.0	358	253	686	667	194	180	127	215	123	74
26	19.0	1,021.0	341	276	890	618	194	177	139	230	122	73
27	18.0	929.0	358	266	905	688	218	172	146	230	121	73
28	16.0	855.0	387	309	1,048	750	250	180	148	215	120	73
29	15.0	370.0	358	374	980	905	295	180	152	209	119	73
30	14.0	.....	325	384	893	967	224	169	146	209	118	73
31	13.0	.....	253	.....	933	.....	182	162	.....	209	.....	72
1917.												
1	72	50	66	600	498	819	255	352	360	82	125	74
2	72	51	66	800	477	747	264	349	360	78	130	72
3	72	52	66	1,000	696	696	346	356	360	78	250	66
4	71	53	66	1,600	1,074	557	377	356	370	75	200	60
5	70	55	66	2,547	795	503	384	363	377	73	175	55
6	70	56	65	3,039	580	461	380	366	377	73	150	45
7	69	58	65	3,326	1,011	461	388	384	374	73	130	42
8	68	60	65	3,203	1,228	421	380	380	380	73	120	40
9	67	62	65	3,203	1,046	433	380	363	384	73	105	40
10	66	64	65	2,998	1,081	457	388	405	377	78	94	40
11	65	65	65	2,449	1,025	837	398	402	363	78	94	38
12	64	66	65	2,367	1,081	1,258	398	380	342	78	94	38
13	63	66	65	2,121	1,081	1,328	388	363	261	78	96	36
14	62	66	65	1,711	1,018	855	388	363	210	78	90	34
15	60	67	65	1,227	1,067	605	380	356	177	78	96	34
16	59	67	65	753	920	503	388	349	118	81	96	35
17	59	67	64	575	955	461	380	356	105	98	88	38
18	58	68	64	489	669	425	377	352	100	84	88	45
19	57	68	64	485	590	405	356	352	98	102	96	52
20	56	68	63	641	526	388	342	349	98	110	101	58
21	55	68	63	753	590	391	332	346	80	120	88	58
22	54	68	63	783	962	394	328	346	82	155	90	55
23	54	68	64	765	702	413	324	360	80	155	82	50
24	53	68	64	753	647	380	328	356	82	175	87	48
25	52	68	66	615	674	346	335	349	75	155	88	48
26	51	68	68	696	702	338	342	349	92	135	88	52
27	51	67	70	605	948	318	349	349	92	100	87	60
28	50	67	80	590	759	310	342	349	92	65	86	80
29	50	.....	100	402	702	279	346	349	92	70	85	120
30	50	.....	200	402	1,220	267	342	352	90	85	80	200
31	50	.....	400	.....	849	.....	342	356	.....	100	.....	300

NOTE.—1911: Stage-discharge relation affected by ice Apr. 4–6 and Nov. 11 to Dec. 31. Discharge estimated June 25–26 and for November and December.

1912: Gage out from Mar. 29 to Apr. 3.

1913: Stage-discharge relation affected by ice Jan. 1 to Apr. 10 and Nov. 12 to Dec. 31.

1914: Stage-discharge relation affected by ice Jan. 1 to Apr. 3 and Nov. 14 to Dec. 31.

1915: Stage-discharge relation affected by ice Jan. 1 to Mar. 27 and Nov. 19 to Dec. 31. Discharge estimated Mar. 18–26, Aug. 19, Nov. 11 and 18.

1916: Stage-discharge relation affected by ice Jan. 1 to Feb. 16, Feb. 29 to Mar. 9, and Nov. 8 to Dec. 31. Control shifting Feb. 17–18, May 10 to July 19. Mean daily stage Sept. 9 to Oct. 2 obtained by water-stage recorder; discharge determined from hydrograph.

1917: Stage-discharge relation affected by ice Jan. 1 to Apr. 4, Oct. 19 to Nov. 3, and Nov. 27 to Dec. 31. Shifting control June 9 to July 25 and Nov. 4–9. Discharge estimated Sept. 30.

Monthly discharge of Milk River at Milk River, Alta., 1909–1917.

[Drainage area, 1,104 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1909.						
July	1,344	96	299	0.278	0.32	18,385
August	370	72	129	.117	.13	7,932
September	96	56	78	.071	.08	4,641
October	82	56	72	.065	.07	4,427
November 1–19	194	67	120	.109	.08	4,522
The period					.68	39,907
1910.						
April	264.0	130.0	203.5	.189	.211	12,109
May	252.0	106.0	174.0	.162	.186	10,700
June	304.0	50.5	99.4	.092	.103	5,915
July	52.0	13.5	30.5	.028	.033	1,875
August	34.5	13.0	20.9	.019	.022	1,285
September	83.5	33.0	55.1	.051	.057	3,279
October	110.5	45.5	53.9	.051	.059	3,314
November 1–4	72.5	49.5	59.8	.054	.008	474
The period					.679	38,951
1911.						
April	589	111	308	.286	.32	18,327
May	1,884	224	399	.370	.43	24,534
June	2,049	101	355	.329	.37	21,124
July	401	68	128	.119	.14	7,870
August	176	56	91.2	.085	.10	5,607
September	927	50	252	.234	.26	14,995
October	172	73	119	.110	.13	7,317
November	208	69	126	.118	.13	7,498
December	125	45	79	.073	.08	4,858
The period					1.96	112,150
1912.						
January	53	12	37.7	.035	.04	2,318
February	88	66	77.3	.072	.08	4,446
March 1–28	852	52	144.0	.134	.14	7,997
April 3–30	1,504	229	496.0	.460	.48	27,546
May	1,104	187	293.0	.272	.31	18,016
June	214	56	105.0	.097	.11	6,248
July	214	60	126.0	.117	.13	7,747
August	94	48	62.3	.058	.07	3,831
September	91	47	64.7	.060	.07	3,850
October	103	59	81.1	.075	.09	4,987
November 1–19, 21–25	150	60	102.5	.093	.08	4,878
The period					1.60	91,864
1913.						
January	8.0	7.0	7.18	.007	.01	441
February	10.6	7.0	8.54	.007	.01	474
March	7.0	7.0	7.00	.006	.01	430
April	1,888.0	77.0	745.00	.692	.77	44,331
May	782.0	276.0	415.00	.385	.44	25,517
June	525.0	157.0	256.00	.238	.26	15,233
July	337.0	68.0	118.00	.110	.13	7,256
August	167.0	36.0	73.40	.068	.08	4,513
September	74.0	28.0	41.10	.038	.04	2,446
October	185.0	32.0	86.90	.810	.09	5,334
November	94.0	28.0	60.00	.056	.06	3,570
December	102.0	12.0	45.20	.042	.05	2,779
The year					1.95	112,333
1914.						
January	35	11.3	25.0	.023	.030	1,537
February	34	1.0	9.7	.009	.010	538
March	215	38.0	92.0	.083	.100	5,657
April	912	139.0	317.0	.287	.320	18,863
May	245	80.0	150.0	.136	.160	9,223
June	146	41.0	71.0	.065	.070	4,225
July	53	6.3	25.0	.023	.030	1,537
August	50	4.0	22.0	.020	.020	1,353
September	36	23.0	28.0	.025	.030	1,666
October	240	21.0	133.0	.120	.140	8,178
November	150	34.0	79.7	.072	.080	4,742
December	57	19.5	28.0	.025	.029	1,722
The year					1.019	59,241

Monthly discharge of Milk River at Milk River, Alta., 1909–1917—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1915.						
January	31	21	26	0.024	0.03	1,599
February	31	21	27	.024	.03	1,500
March	1,200	31	253	.229	.26	15,556
April	684	62	174	.158	.18	10,354
May	428	77	180	.163	.19	11,068
June	1,234	77	432	.391	.44	25,706
July	671	150	263	.238	.27	16,171
August	339	87	151	.137	.16	9,285
September	948	85	225	.204	.23	13,388
October	244	150	192	.174	.20	11,806
November	177	81	122	.111	.12	7,260
December	85	40	63	.057	.07	3,874
The year	.....	.....	.....	.....	2.18	127,567
1916.						
January	38	13.0	24	.022	.03	1,476
February	3,467	12.6	768	.696	.75	44,176
March	1,829	50.0	538	.487	.56	33,080
April	472	253.0	332	.301	.34	19,755
May	1,048	300.0	488	.442	.51	30,006
June	967	385.0	645	.584	.65	38,380
July	870	172.0	354	.321	.37	21,767
August	593	138.0	226	.205	.24	13,896
September	763	127.0	218	.197	.22	12,972
October	282	139.0	216	.196	.23	13,281
November	206	118.0	151	.137	.15	8,985
December	118	72.0	94	.085	.10	5,780
The year	.....	.....	.....	.....	4.15	243,554
1917.						
January	72	50	60	.....	.....	3,689
February	68	50	63	.....	.....	3,499
March	400	63	82	.....	.....	5,042
April	3,326	402	1,383	.....	.....	82,294
May	1,228	477	844	.....	.....	51,896
June	1,328	267	535	.....	.....	31,835
July	398	255	356	.....	.....	21,890
August	405	346	360	.....	.....	22,136
September	384	75	215	.....	.....	12,793
October	175	65	95	.....	.....	5,841
November	250	80	109	.....	.....	6,436
December	300	34	65	.....	.....	3,997
The year	.....	.....	.....	.....	.....	251,398

NOTE—Owing to part of the discharge being water from the United States Reclamation Service St. Mary canal, the run-off on the drainage area has not been computed. Area used in the tables is the same as published in the Canadian hydrometric reports which was changed from time to time as more definite information of the drainage basin was obtained.

Mean monthly discharge, in second-feet, of Milk River at Milk River, Alta., 1909–1917.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total in acre-feet.
1909	.....	.....	.....	.....	.....	.....	299	129	78	72	[a] 120	.....	[a] 39,907
1910	.....	.....	.....	204	174	99	30	21	55	54	[a] 60	.....	[a] 38,951
1911	.....	.....	.....	308	399	355	128	91	252	119	126	79	[a] 112,130
1912	38	77	[b] 242	[b] 565	293	105	126	62	65	81	[b] 90	[b] 13	106,000
1913	7	8	7	745	415	256	118	73	41	87	60	45	112,333
1914	25	10	92	317	150	71	25	22	28	133	80	28	59,241
1915	26	27	253	174	180	432	263	151	225	192	122	63	127,567
1916	24	768	538	332	488	645	354	226	218	216	151	94	243,554
1917	60	63	82	1,383	844	535	[c] 356	[c] 360	[c] 215	95	109	65	[c] 251,398
Average	30	159	202	504	368	312	168	97	120	106	105	55	129,739
Average run-off, acre-feet.	1,845	9,100	12,420	29,990	22,627	18,565	10,330	5,964	7,140	6,307	5,248	3,382	133,918
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	121

[a] Incomplete record not included in average.
[b] Estimated.
[c] Not used in average, as flow included water from St. Mary canal, U. S. Reclamation Service.

Duration of flow (number of days in the year) of Milk River at Milk River, Alta., 1909–1917.

Flow (second-feet).	1909	1910	1911	1912	1913	1914	1915	1916	1917	Total.	Average.
3,000	.....	.....	.....	.....	.....	.....	.....	2	4	6	1
2,000	.....	.....	1	.....	.....	.....	.....	2	9	12	1
1,900	.....	.....	1	.....	.....	.....	.....	3	9	13	1
1,800	.....	.....	2	.....	2	.....	.....	5	9	18	2
1,700	.....	.....	2	.....	2	.....	.....	5	10	19	2
1,600	.....	.....	2	.....	2	.....	.....	5	11	20	2
1,500	.....	.....	2	1	2	.....	.....	7	11	23	2
1,400	.....	.....	2	1	5	.....	.....	7	11	26	3
1,300	1	.....	3	1	6	.....	.....	9	12	32	3
1,200	1	.....	3	1	8	.....	2	11	16	42	4
1,100	1	.....	3	3	9	.....	2	11	17	46	5
1,000	2	.....	4	4	9	.....	5	15	26	65	7
900	2	.....	7	5	9	1	9	21	30	84	9
800	3	.....	7	6	14	1	10	31	35	107	12
700	3	.....	9	7	16	2	10	37	46	130	14
600	3	.....	10	15	19	3	14	52	57	173	19
500	3	.....	13	17	24	4	18	73	65	217	24
400	4	.....	25	19	45	5	26	87	84	295	33
300	6	1	38	25	61	16	48	143	163	501	55
200	23	27	92	61	79	34	102	213	173	804	89
150	41	55	114	79	98	59	175	256	180	1,057	117
100	54	75	208	114	119	87	231	306	197	1,391	154
90	61	77	218	136	129	92	242	310	214	1,479	164
80	96	83	231	182	151	118	255	312	235	1,663	185
70	124	91	246	217	179	136	267	323	260	1,843	204
60	132	104	261	246	194	150	273	323	320	2,003	222
50	140	136	265	283	207	168	285	323	350	2,157	239
40	.....	159	275	310	231	193	298	324	358	2,288	254
30	.....	178	.....	325	267	221	316	331	365	2,418	269
20	.....	186	.....	326	271	306	365	352	.....	2,586	287
10	.....	218	.....	328	279	329	.....	366	.....	2,665	296
9	.....	.....	.....	.....	289	333	.....	.....	.....	2,679	297
8	.....	.....	.....	.....	293	335	.....	.....	.....	2,685	298
7	.....	.....	.....	.....	365	344	.....	.....	.....	2,766	307
6	.....	.....	.....	.....	.....	350	.....	.....	.....	2,772	308
5	.....	.....	.....	.....	.....	354	.....	.....	.....	2,776	308
4	.....	.....	.....	.....	.....	361	.....	.....	.....	2,783	309
3	.....	.....	.....	.....	.....	362	.....	.....	.....	2,784	309
2	.....	.....	.....	.....	.....	364	.....	.....	.....	2,786	309
1	140	218	275	328	365	365	365	366	365	2,787	309

MILK RIVER AT WRITING-ON-STONE POLICE DETACHMENT, ALTA.

LOCATION.—In SW. ¼ sec. 35, T. 1, R. 13 W. fourth meridian.

DRAINAGE AREA.—1,546 square miles.

RECORDS AVAILABLE.—Open-water records August 2, 1909, to October 31, 1915.

GAGE.—Vertical staff; zero maintained at elevation 86.13 feet since establishment. Gage read by Constable A. P. White and W. Adams.

DISCHARGE MEASUREMENTS.—Made from cable or by wading.

CHANNEL AND CONTROL.—Bed sandy, clean, and shifting. One channel at all stages. Both banks high and wooded but subject to overflow in very high water.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 6.20 feet June 26, 1911 (discharge, 2,068 second-feet); minimum, 1.15 feet August 8, 1914 (discharge, 2.2 second-feet).

ICE.—Stream freezes over during winter season, but no observations have been made.

ACCURACY.—Stage-discharge relation not permanent. Gage read daily to hundredths. Records fair.

Discharge measurements of Milk River at Writing-on-Stone Police Detachment, Alta., 1910–1915.

Date.	Made by—	Gage height.	Discharge.
1910.		*Feet.*	*Sec.-ft.*
Apr. 10	F. H. Peters	2.31	218
20	N. M. Sutherland	2.19	200
29	do	2.22	214
May 4	do	2.115	176
11	F. H. Peters	2.07	159
18	N. M. Sutherland	2.31	221
21	do	2.445	248
28	do	2.13	150
31	do	2.01	133
June 10	F. H. Peters	1.98	106
17	N. M. Sutherland	1.79	77.8
22	do	1.74	79.6
29	do	1.595	49.9
July 4	do	1.60	50.2
9	F. H. Peters	1.52	41.0
19	do	1.27	21.7
20	N. M. Sutherland	1.155	19.9
Aug 6	do	1.14	14.6
6	do	1.14	14.6
10	do	1.155	13.2
11	do	1.165	15.6
16	do	1.195	15.6
17	do	1.215	16.6
22	L. J. Gleeson	1.14	15.5
27	do	1.24	20.3
Sept. 15	G. H. Whyte	1.745	62.2
22	do	1.56	33.3
29	do	1.72	57.1
Oct. 6	do	1.65	53.7
10	do	1.61	45.2
15	do	1.60	43.7
23	do	1.65	47.8
30	do	1.63	50.1
Nov. 6	do	1.74	59.9
14	do	1.485	27.0
1911			
Apr. 17	N. McL. Sutherland	2.52	233.84
May 4	do	2.36	211.32
14	do	2.47	234.40
24	J. E. Degnan	2.85	316.86
June 6	do	2.45	214.60
16	do	2.21	145.17
July 7	do	2.36	174.56
25	do	1.94	94.50
Aug. 11	do	2.34	178.82
21	do	1.67	58.19
Sept. 2	do	1.66	53.05
12	do	2.70	277.38
18	do	2.13	130.98
Oct. 4	do	2.21	143.98
23	do	2.09	122.94
Nov. 7	do	2.25	125.75
1912.			
Apr. 25	do	2.65	269.46
19	do	2.45	200.21
30	do	2.57	221.57
May 7	do	2.54	226.58
June 10	do	2.12	129.77
21	do	1.97	94.41
27	do	1.75	64.16
July 3	do	2.16	141.87
17	do	2.04	114.65
27	do	2.25	161.30
Aug. 5	do	1.93	83.58
12	do	1.79	65.38
20	do	1.88	82.03
30	do	1.64	45.06
Sept. 12	do	1.81	58.80
18	do	1.72	48.80
27	do	1.96	84.90
Oct. 9	do	2.00	87.00
17	do	2.00	87.00
31	do	1.92	67.39
Nov. 9	do	1.78	51.10
16	do	2.07	98.80
1913.		*Feet.*	*Sec.-ft.*
Apr. 24	J. E. Degnan	3.50	602.0
May 4	do	2.95	364.0
12	do	2.64	273.0
20	do	3.48	561.0
26	do	3.20	439.0
June 6	do	2.82	330.0
12	do	2.57	264.0
24	do	2.32	189.0
25	do	2.30	172.0
July 2	do	2.89	355.0
11	do	2.04	112.0
21	do	1.85	82.5
30	do	1.98	103.6
Aug. 6	do	1.71	66.5
19	do	1.87	79.8
27	do	1.66	43.5
Sept. 6	do	1.65	43.8
15	do	1.58	34.4
22	do	1.67	44.2
Oct. 1	do	1.74	51.7
13	do	1.91	79.1
20	do	1.96	89.0
29	do	1.89	76.1
Nov. 4	do	1.78	68.1
10	do	1.86	75.1
1914.			
Apr. 3	do	2.89	330.0
20	do	2.43	180.0
May 1	do	2.24	162.0
10	do	2.51	225.0
18	do	2.07	128.0
23	do	2.30	170.0
June 2	do	1.93	85.0
9	do	1.91	93.0
22	do	1.78	63.0
July 2	do	1.80	61.0
15	do	1.53	26.0
24	do	1.39	13.6
Aug. 1	do	1.24	5.2
8	do	1.16	2.5
19	do	1.42	18.7
25	F. R. Steinberger	1.67	42.0
Sept. 5	do	1.52	20.5
16	J. E. Degnan	1.65	32.0
Oct. 2	do	1.51	20.4
16	do	2.26	145.0
23	do	2.32	146.0
1915.			
Mar. 18	W. H. Storey	3.00	116
30	do	2.59	276
Apr. 11	do	2.30	192
23	do	1.98	114
May 2	do	1.80	90
20	do	2.65	294
29	G. H. Whyte	1.97	116
June 15	W. H. Storey	2.69	280
23	do	2.55	225
July 13	do	2.38	185
21	do	2.87	331
31	do	3.38	528
Aug. 7	do	2.24	154
18	do	2.05	120
25	do	2.20	146
Sept. 4	do	2.51	199
5	do	4.09	833
15	do	2.62	242
24	do	2.28	167
Oct. 2	do	2.25	164
4	do	2.26	164
13	do	2.43	186
19	do	2.36	181
30	do	2.19	142

Daily discharge, in second-feet, of Milk River at Writing-on-Stone Police Detachment, Alta., 1909–1915.

Day.	Aug.	Sept.	Oct.	Nov.	Day.	Aug.[a]	Sept.	Oct.	Nov.
1909.					1909.				
1	.....	83	72	90	16	115	82	80	.....
2	347	84	73	90	17	110	86	80	.....
3	300	84	73	90	18	105	85	78	.....
4	271	84	74	90	19	99	82	72	.....
5	245	84	74	90	20	95	82	67	.....
6	223	84	73	90	21	90	80	80	.....
7	213	89	72	100	22	87	79	82	.....
8	204	91	72	132	23	85	78	82	.....
9	194	85	72	130	24	83	86	82	.....
10	183	79	73	130	25	83	85	85	.....
11	170	70	74	124	26	81	81	82	.....
12	150	69	74	122	27	80	81	82	.....
13	159	73	74	119	28	81	80	82	.....
14	129	75	74	.....	29	80	76	85	.....
15	122	80	78	.....	30	81	75	88	.....
					31	85	.....	94	.....

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1910.									
1	.....	140.0	213.0	128.5	50.0	14.2	35.5	56.5	56.5
2	.....	153.5	206.0	124.0	49.0	13.0	37.5	56.0	51.0
3	.....	157.0	185.0	132.5	55.5	13.5	43.5	55.5	53.5
4	.....	150.0	177.5	117.0	65.0	13.5	44.5	53.5	55.0
5	.....	147.5	170.5	112.5	45.0	14.0	46.5	53.0	52.5
6	.....	147.5	156.5	110.5	45.5	15.0	49.5	52.5	59.9
7	.....	131.0	136.0	109.0	51.0	14.0	61.5	49.0	44.0
8	.....	137.0	101.5	110.0	44.5	13.5	62.0	48.0	45.5
9	.....	197.5	84.0	105.0	41.0	13.5	68.0	44.0	49.5
10	.....	222.0	128.5	138.0	40.5	13.5	90.0	44.0	41.0
11	.....	224.5	159.0	307.5	39.0	15.5	86.5	45.5	43.0
12	.....	259.5	155.5	217.5	38.0	[a] 16.5	[a] 77.0	44.5	59.5
13	.....	270.5	208.5	174.5	36.5	15.5	71.0	45.5	47.0
14	.....	270.0	236.5	139.0	34.5	15.5	69.0	43.5	27.0
15	.....	279.5	222.5	93.0	32.0	15.0	61.5	44.5	.....
16	.....	268.5	192.5	87.5	30.5	15.5	55.0	46.5	.....
17	.....	210.5	207.0	82.5	[a] 28.0	17.0	52.0	47.0	.....
18	.....	189.5	229.0	82.5	[a] 25.5	17.5	48.0	49.0	.....
19	.....	190.5	225.0	85.0	23.0	18.5	43.5	51.5	.....
20	.....	193.5	274.5	83.5	21.0	17.5	38.5	49.5	.....
21	.....	211.0	243.5	77.0	[a] 20.0	17.5	37.0	50.0	.....
22	.....	217.5	278.5	75.0	[a] 19.0	17.5	32.0	50.0	.....
23	.....	222.0	260.5	86.5	18.0	17.0	31.5	53.0	.....
24	.....	229.5	209.5	81.5	17.5	17.5	36.0	[a] 53.0	.....
25	.....	[a] 216.5	173.0	78.5	16.0	18.0	41.5	51.5	.....
26	.....	[a] 206.0	158.5	70.0	15.0	20.0	46.5	51.5	.....
27	.....	196.5	145.0	63.5	14.0	[a] 20.5	[a] 51.0	40.0	.....
28	.....	231.0	146.5	63.0	14.2	23.0	55.0	20.0	.....
29	.....	214.0	151.5	53.0	14.2	27.0	54.5	51.0	.....
30	.....	221.5	142.5	50.5	14.5	29.0	55.5	55.0	.....
31	.....	.....	133.0	.....	14.2	33.5	.....	56.5	.....

[a] Interpolated.

Daily discharge, in second-feet, of Milk River at Writing-on-Stone Police Detachment, Alta., 1909–1915—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1911.									
1	.....	458	210	278	a 516	97	68	150	189
2	.....	412	201	232	a 418	103	53	152	120
3	.....	300	218	223	a 418	114	116	154	a 150
4	.....	226	a 233	216	324	111	233	148	187
5	.....	108	a 247	271	a 272	107	230	157	177
6	.....	120	263	215	224	120	a 631	170	175
7	.....	186	289	211	184	154	a 827	157	126
8	.....	229	366	193	163	187	a 697	157	.....
9	.....	197	372	175	150	179	a 565	154	.....
10	.....	244	291	179	136	187	a 500	150	.....
11	.....	309	233	252	134	165	388	150	.....
12	.....	482	250	177	132	144	260	144	.....
13	.....	372	234	159	124	132	208	138	.....
14	.....	287	245	157	120	116	165	134	.....
15	.....	256	262	a 150	113	103	148	132	.....
16	.....	241	a 532	a 141	105	97	124	128	.....
17	.....	226	a 1,128	136	99	91	124	124	.....
18	.....	248	a 969	134	97	77	134	128	.....
19	.....	264	a 636	126	97	67	132	124	.....
20	.....	307	a 494	120	100	59	136	124	.....
21	.....	274	391	109	99	57	144	124	.....
22	.....	335	312	175	102	55	150	124	.....
23	a 683	439	305	114	99	47	142	124	.....
24	a 593	489	318	291	95	43	148	134	.....
25	a 547	418	335	a 569	95	41	152	128	.....
26	a 526	362	342	a 2,068	95	42	157	124	.....
27	a 474	395	367	a 1,179	95	48	163	124	.....
28	401	451	384	a 761	95	55	172	109	.....
29	369	385	352	a 577	88	57	161	57	.....
30	351	345	371	a 492	80	60	154	84	.....
31	365	.....	342	.....	78	61	.....	144	.....
1912.									
1	.....	.....	261	.....	80	76	44	83	41
2	.....	.....	234	.....	94	75	43	b 79	49
3	.....	.....	243	.....	131	72	42	74	68
4	.....	.....	238	.....	174	70	48	b 72	87
5	.....	.....	244	.....	169	87	55	b 69	87
6	.....	.....	240	.....	150	88	54	67	87
7	.....	.....	227	.....	116	91	54	64	85
8	.....	.....	215	.....	123	109	57	72	47
9	.....	.....	200	.....	.....	94	b 64	87	51
10	.....	.....	242	131	.....	82	74	82	50
11	.....	.....	267	b 116	.....	67	66	80	85
12	.....	.....	258	b 101	.....	73	60	82	80
13	.....	.....	223	b 90	.....	63	67	85	90
14	.....	.....	b 215	78	124	56	53	87	136
15	.....	.....	209	126	126	55	50	90	136
16	.....	.....	200	116	118	59	52	92	99
17	.....	.....	192	126	113	58	50	94	.....
18	.....	.....	b 197	116	116	58	50	80	.....
19	.....	.....	200	116	96	69	53	78	.....
20	.....	.....	.....	111	92	77	59	76	.....
21	.....	.....	.....	99	107	83	61	75	.....
22	.....	.....	.....	92	105	72	63	75	.....
23	.....	.....	.....	78	182	70	83	80	.....
24	.....	.....	.....	70	210	62	83	79	.....
25	.....	.....	.....	67	174	56	90	68	.....
26	.....	.....	.....	60	184	56	96	74	.....
27	.....	.....	.....	60	162	51	85	73	.....
28	.....	.....	.....	b 64	128	48	90	72	.....
29	.....	.....	.....	b 67	116	46	84	78	.....
30	.....	.....	221	70	96	43	86	79	.....
31	.....	.....	.....	.....	83	43	.....	67	.....

a Estimated. b Interpolated.

Daily discharge, in second-feet, of Milk River at Writing-on-Stone Police Detachment, Alta., 1909–1915—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1913.									
1	.....	70	402	406	428	71	52	55	73
2	.....	100	332	435	351	71	54	55	66
3	.....	180	300	381	303	71	51	54	59
4	.....	250	354	370	a 242	66	53	52	68
5	.....	230	424	348	189	74	45	58	a 95
6	.....	410	328	325	183	52	44	76	122
7	.....	580	275	303	167	54	44	80	a 127
8	.....	700	300	300	160	56	44	79	130
9	.....	780	303	281	138	54	48	89	84
10	.....	1,000	338	272	155	69	38	82	72
11	.....	1,100	296	278	114	84	38	84	73
12	.....	1,500	272	281	115	143	36	82	70
13	.....	1,880	322	284	112	143	35	85	77
14	.....	1,808	395	239	113	118	37	85	93
15	.....	1,468	410	217	118	97	37	125	75
16	.....	1,674	435	192	109	80	40	136	118
17	.....	1,434	406	178	103	76	35	146	104
18	.....	920	478	170	98	a 78	36	127	104
19	.....	782	510	183	99	80	41	87	71
20	.....	768	550	189	96	81	42	89	40
21	.....	741	615	175	82	68	42	87	36
22	.....	712	582	189	84	66	47	87	22
23	.....	626	467	217	82	73	54	75	22
24	.....	579	478	183	81	61	58	66	24
25	.....	442	507	281	80	54	57	68	37
26	.....	395	467	162	77	50	75	50	33
27	.....	370	453	272	77	47	74	a 60	31
28	.....	370	485	254	72	48	72	72	22
29	.....	189	474	478	a 89	45	61	88	24
30	.....	471	460	514	108	43	54	84	39
31	.....	.....	456	.....	93	48	.....	37	.....
1914.									
1	.....	166	159	96	78.0	5.2	28.0	22	.....
2	.....	288	178	88	63.0	4.5	24.0	22	.....
3	.....	369	183	70	56.0	4.5	24.0	26	.....
4	.....	371	180	70	56.0	3.8	23.0	33	.....
5	.....	316	203	70	49.0	3.5	21.0	54	.....
6	.....	285	214	76	46.0	2.8	20.0	35	.....
7	.....	532	203	80	42.0	2.5	19.3	71	.....
8	.....	507	198	86	42.0	2.2	23.0	112	.....
9	.....	378	305	90	42.0	3.2	25.0	87	.....
10	.....	312	224	96	41.0	4.9	23.0	82	.....
11	.....	430	211	86	42.0	11.0	22.0	84	.....
12	.....	422	198	86	33.0	7.0	21.0	77	.....
13	.....	352	183	103	27.0	7.0	28.0	87	.....
14	.....	637	161	92	27.0	7.5	30.0	91	.....
15	.....	401	137	101	30.0	7.5	32.0	97	.....
16	.....	320	144	132	28.0	7.5	32.0	112	.....
17	.....	272	125	156	28.0	6.6	32.0	277	.....
18	135	258	123	114	26.0	21.0	32.0	334	.....
19	127	218	114	88	23.0	14.2	32.0	303	.....
20	137	193	130	82	21.0	15.0	31.0	268	.....
21	112	172	137	78	21.0	12.9	30.0	234	.....
22	188	158	144	60	21.0	39.0	28.0	186	.....
23	245	235	154	53	12.3	46.0	28.0	159	.....
24	219	180	144	53	11.0	48.0	28.0	133	.....
25	101	183	135	60	11.0	46.0	26.0	112	.....
26	84	220	121	52	11.0	39.0	23.0	101	.....
27	86	210	121	67	9.8	33.0	22.0	95	.....
28	274	188	114	82	7.0	32.0	22.0	91	.....
29	269	163	107	96	7.0	35.0	22.0	89	.....
30	183	155	103	92	5.6	35.0	22.0	82	.....
31	123	.....	96	.....	5.2	31.0	.....	82	.....

a Interpolated.

Daily discharge, in second-feet, of Milk River at Writing-on-Stone Police Detachment, Alta., 1909–1915—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1915.									
1	.....	233	83	100	459	399	135	156	.....
2	.....	236	90	102	313	246	158	155	.....
3	.....	417	157	118	317	360	177	170	.....
4	.....	501	335	360	313	246	218	156	.....
5	.....	664	338	862	317	195	866	162	.....
6	.....	417	347	1,120	288	193	499	168	.....
7	.....	308	320	1,094	282	158	268	183	.....
8	.....	272	181	999	278	145	218	197	.....
9	.....	245	178	681	302	126	183	190	.....
10	.....	308	166	350	299	123	187	197	.....
11	.....	305	143	311	207	122	164	221	.....
12	.....	171	98	477	197	121	340	210	.....
13	.....	166	96	311	179	149	268	213	.....
14	.....	152	107	314	174	128	278	208	.....
15	.....	157	116	382	170	125	253	203	.....
16	.....	148	236	290	170	126	234	197	.....
17	.....	150	440	314	170	122	221	193	.....
18	116	148	411	320	172	122	187	185	.....
19	[a] 400	145	395	335	174	121	179	179	.....
20	[a] 1,000	141	293	417	531	122	164	168	.....
21	[a] 500	145	284	395	344	125	155	164	.....
22	[a] 650	127	248	320	221	256	164	155	.....
23	[a] 1,100	123	171	237	207	147	168	153	.....
24	1,008	129	166	240	190	145	162	151	.....
25	707	118	159	237	215	145	156	155	.....
26	401	119	152	246	185	135	156	149	.....
27	293	93	143	1,111	177	128	172	147	.....
28	248	92	137	707	195	127	164	147	.....
29	233	90	118	724	543	125	160	143	.....
30	260	84	100	539	459	127	155	145	.....
31	248	.....	107	.....	483	128	.....	151	.....

[a] Estimated.

NOTE.—1913: Apr. 1–20, ice breaking up; discharge estimated.
1914: Shifting control Apr. 3–30 and Aug. 25 to Sept. 5.

Monthly discharge of Milk River at Writing-on-Stone Police Detachment, Alta., 1909-1915.

[Drainage area, 1,546 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1909.						
August 2–31	347	80	145.0	0.094	0.10	8,628
September	91	69	81.0	.052	.06	4,820
October	94	67	78.0	.050	.06	4,796
November 1–13	132	90	108.0	.070	.03	2,784
The period					.25	21,028
1910.						
April	279.0	131.0	207.0	.134	.15	12,305
May	278.0	84.0	184.0	.119	.14	11,326
June	307.0	50.0	108.0	.070	.08	6,420
July	65.0	15.0	33.0	.021	.02	2,011
August	33.0	13.0	18.0	.012	.01	1,082
September	90.0	31.0	53.0	.034	.04	3,136
October	56.0	20.0	49.0	.031	.04	2,994
November 1–14	60.0	27.0	49.0	.032	.02	1,361
The period					.50	40,635
1911.						
March 23–31	683	351	479.0	.310	.10	8,551
April	489	108	317.0	.205	.23	18,863
May	1,128	209	371.0	.240	.28	22,812
June	2,068	109	334.0	.216	.24	19,874
July	516	78	161.0	.104	.12	9,838
August	187	41	96.0	.062	.07	5,903
September	827	53	243.0	.157	.18	14,460
October	170	57	134.0	.087	.10	8,239
November 1–6	189	120	161.0	.104	.02	2,235
The period					1.34	110,775
1912.						
May 1–19 and 30	267	192	226.0	.146	.11	8,965
June 10–30	131	60	93.0	.060	.04	3,874
July 1–8 and 14–31	210	80	130.0	.084	.08	6,682
August	109	43	68.0	.044	.05	4,181
September	96	42	64.0	.041	.05	3,802
October	94	64	78.0	.050	.06	4,784
November 1–16	136	41	80.0	.051	.03	2,539
The period					.42	34,827
1913.						
April	1,880	70	751.0	.486	.54	44,688
May	615	272	415.0	.269	.31	25,517
June	514	162	279.0	.180	.20	16,602
July	428	72	139.0	.090	.10	8,547
August	143	43	72.0	.047	.05	4,427
September	75	35	48.0	.031	.04	2,862
October	146	37	81.0	.052	.06	4,956
November	130	22	67.0	.043	.05	3,987
The period					1.35	111,586
1914.						
March 18–31	274	84.0	163.0	.105	.06	4,530
April	637	155.0	296.0	.191	.21	17,613
May	305	96.0	160.0	.103	.12	9,838
June	156	52.0	85.0	.055	.06	5,058
July	78	5.2	30.0	.019	.02	1,845
August	48	2.2	17.4	.011	.01	1,070
September	32	19.3	26.0	.017	.02	1,547
October	334	22.0	117.0	.076	.09	7,194
The period					.59	48,695
1915.						
March 18–31	1,100	116.0	512.0	.331	.17	14,218
April	664	84.0	213.0	.138	.15	12,674
May	440	83.0	204.0	.132	.15	12,543
June	1,120	100.0	467.0	.302	.34	27,788
July	543	170.0	275.0	.178	.21	16,909
August	399	121.0	162.0	.105	.12	9,961
September	866	135.0	227.0	.147	.16	13,507
October	221	143.0	173.0	.112	.13	10,637
The period					1.43	118,237

Mean monthly discharge, in second-feet, of Milk River at Writing-on-Stone Police Detachment, Alta., 1909-1915.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total in acre-feet.
1909	.....	.....	.....	.....	.....	[a] 145	81	78	[b] 108	[b] 21,316
1910	.....	207	184	108	33	18	53	49	[b] 49	40,524
1911	[b] 479	317	371	334	161	96	243	134	[b] 161	110,775
1912	.....	.....	[b] 226	[b] 93	[b] 130	68	64	78	[b] 80	[b] 34,827
1913	.....	751	415	279	139	72	48	81	67	111,586
1914	[b] 163	296	160	85	30	17	26	117	.....	48,695
1915	[b] 512	213	204	467	275	162	227	173	.....	118,237
Average	.....	357	267	255	128	83	106	101	67	85,963
Average, acre-feet	.....	21,243	16,417	15,174	7,870	5,103	6,307	6,210	3,987	82,250
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	53

[a] Average for part of month assumed as mean for month.
[b] Records incomplete, not included in average.

MILK RIVER AT PENDANT D'OREILLE POLICE DETACHMENT, ALTA.

LOCATION.—In SW. ¼ sec. 21, T. 2, R. 8 W. fourth meridian.

DRAINAGE AREA.—2,169 square miles.

RECORDS AVAILABLE.—Open-water records August 5, 1909, to October 31, 1915.

GAGE.—Vertical staff. Zero elevation maintained at 82.45 feet since establishment. Observers, Corp. T. B. Caulkin, Corp. T. R. Brewer, J. E. Capstick, and R. G. Lipton.

DISCHARGE MEASUREMENTS.—Made from cable or by wading.

CHANNEL AND CONTROL.—Bed sandy, clean, shifting. One channel at all stages unless split up by a sand bar. Right bank low, wooded, subject to overflow; left bank high, clean, subject to overflow at extremely high floods.

EXTREMES OF DISCHARGE.—1909–1915: Maximum stage recorded, 5.30 feet June 6, 1915 (discharge 1,866 second-feet); minimum stage 2 feet on August 6 to August 17, 1914 (no discharge).

ICE.—Station not maintained during winter.

ACCURACY.—Stage-discharge relation variable, owing to shifting bed and control. Records fair.

Discharge measurements of Milk River at Pendant d'Oreille Police Detachment, Alta., 1910–1916.

Date.	Made by—	Gage height.	Dis charge.
1910.		*Feet.*	*Sec. ft.*
Apr. 12	F. H. Peters	2.76	217
22	N. M. Sutherland	2.545	191
28	do	2.57	175
May 5	do	2.705	164
12	F. H. Peters	2.69	162
16	N. M. Sutherland	2.83	216
23	do	3.18	255
26	do	2.97	196
June 3	do	2.815	99.6
8	F. H. Peters	2.73	110
16	N. M. Sutherland	2.82	96.1
24	do	2.58	70.7
28	do	2.48	48.4
July 5	do	2.52	57.4
11	F. H. Peters	2.39	34.6
14	N. M. Sutherland	2.29	25.0
18	F. H. Peters	2.21	18.3
23	N. M. Sutherland	2.17	14.3
Aug. 4	do	1.99	5.84
11	do	2.00	7.07
15	do	2.09	10.5
24	L. J. Gleeson	2.06	9.11
26	do	2.06	8.86
Sept. 16	G. H. Whyte	2.50	65.3
20	do	2.415	48.2
30	do	2.47	52.2
Oct. 4	do	2.47	60.5
11	do	2.38	40.9
14	do	2.41	41.2
24	do	2.42	46.1
28	do	2.335	28.4
Nov. 8	do	2.43	46.1
13	do	2.60	39.5
1911.			
Apr. 19	N. McL. Sutherland	3.03	244.19
25	do	3.63	501.51
May 7	do	3.08	231.34
12	do	3.15	231.21
29	J. E. Degnan	3.55	397.87
June 3	do	3.21	238.87
18	do	2.78	133.51
23	do	2.84	152.06
July 12	do	2.93	153.99
21	do	2.75	102.17
Aug. 12	do	3.06	175.50
17	do	2.77	103.62
Sept. 24	do	3.13	203.12
Oct. 1	do	3.07	179.83
27	do	2.95	128.24
Nov. 3	do	3.125	139.33
1912.			
Apr. 28	J. E. Degnan	3.38	317.71
May 4	do	3.24	265.38
23	do	4.41	1,075.03
24	do	4.69	1,188.83
27	do	3.575	379.79
June 12	do	2.84	122.03
18	do	2.78	120.06
29	do	2.51	59.29
July 2	do	2.70	75.54
20	do	2.76	94.41
25	do	3.14	207.00
Aug. 7	do	2.62	88.20
10	do	2.66	90.00
23	do	2.66	60.91
28	do	2.58	39.80
Sept. 14	do	2.66	49.10
16	do	2.64	50.06
Oct. 1	do	2.79	90.03
6	do	2.69	67.11
19	do	2.82	85.00
29	do	2.82	77.40
Nov. 11	do	2.80	84.90
14	do	2.79	75.40
1913.			
Apr. 25	J. E. Degnan	3.88	606
May 1	do	3.73	470
May 14	J. E. Degnan	3.63	447
17	do	3.75	513
29	do	3.83	491
June 4	do	3.61	397
17	do	3.14	211
19	do	3.04	186
July 7	do	3.08	198
9	do	3.00	153
23	do	2.72	84
26	do	2.65	69
Aug. 9	do	2.63	63
16	do	2.755	98
Sept. 2	do	2.43	40
5	do	2.35	31
16	do	2.28	27
19	do	2.32	29
Oct. 4	do	2.38	39
6	do	2.50	52
10	do	2.70	86
22	do	2.70	86
28	do	2.65	62
Nov. 6	do	2.63	53
8	do	2.83	80
1914.			
Mar. 20	J. E. Degnan	2.70	57.0
31	do	3.29	249.0
Apr. 11	H. W. Rowley	3.60	392.0
22	J. E. Degnan	3.13	209.0
27	do	3.07	166.0
May 12	do	3.26	159.0
15	do	3.14	177.0
26	do	3.09	145.0
29	do	2.97	108.0
June 11	do	2.91	88.0
17	do	2.88	89.0
July 6	do	2.64	43.0
12	do	2.50	27.0
27	do	2.14	2.6
30	do	2.14	2.4
Aug. 11	do	.....	.....
18	do	.....	.....
27	F. R. Steinberger	2.55	29.0
Sept. 2	do	2.48	25.0
3	do	2.44	19.7
21	J. E. Degnan	2.51	23.0
28	do	2.45	16.2
Oct. 18	do	3.59	341.0
20	do	3.58	328.0
1915.			
Mar. 22	W. H. Storey	4.32	1,082
27	do	3.41	345
Apr. 13	do	3.05	198
19	do	2.95	156
21	do	2.83	120
May 5	do	3.35	300
18	do	3.70	534
June 1	G. H. Whyte and	2.81	116
13	W. H. Storey	4.04	561
26	do	3.41	285
July 11	do	3.30	262
23	do	3.36	279
30	do	3.77	469
Aug. 10	do	3.00	141
16	do	2.97	137
28	do	2.89	102
Sept. 1	do	2.74	83
2	do	2.82	95
18	do	3.36	220
19	do	3.30	212
22	do	3.19	166
Oct. 7	do	3.30	212
11	do	3.35	219
22	do	3.20	167
28	do	3.10	154
1916.			
Mar. 12	L. J. Gleeson	6.53	3,782
Apr. 2	do	3.05	355

Daily discharge, in second-feet, of Milk River at Pendant d'Oreille Police Detachment, Alta., 1909–1916.

Day.	Aug.	Sept.	Oct.	Nov.	Day.	Aug.	Sept.	Oct.	Nov.
1909.					1909.				
1	.....	86	71	91	16	108	69	88	103
2	.....	86	71	91	17	105	72	88	110
3	.....	84	71	90	18	102	75	88	113
4	.....	83	73	92	19	100	75	88	129
5	249	84	77	94	20	91	72	89	138
6	214	86	77	91	21	91	70	89	.....
7	190	84	77	84	22	91	70	91	.....
8	170	83	78	119	23	90	71	91	.....
9	163	81	79	120	24	84	72	93	.....
10	156	78	79	119	25	84	73	94	.....
11	146	76	79	120	26	84	73	94	.....
12	144	74	83	124	27	82	74	93	.....
13	141	70	85	124	28	81	73	92	.....
14	139	67	82	130	29	83	72	92	.....
15	121	66	84	117	30	83	72	93	.....
					31	84	.....	92	.....

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1910.								
1	132.5	226.5	a 89.5	48.0	7.5	21.5	56.5	a 39.5
2	a 132.5	210.0	78.5	51.5	6.7	21.0	64.5	a 45.5
3	a 129.5	180.0	92.0	55.0	a 6.7	21.0	62.5	49.0
4	129.5	191.0	89.0	55.0	a 6.4	38.0	60.5	45.5
5	132.5	185.5	77.0	55.0	7.1	52.5	60.5	37.0
6	136.0	166.0	80.5	51.5	12.0	52.5	56.5	52.5
7	136.0	154.5	98.0	55.5	16.5	74.0	57.5	31.5
8	136.0	146.0	116.5	56.5	14.5	71.0	50.0	49.0
9	132.5	138.5	97.0	37.5	11.5	70.0	49.0	.....
10	139.5	142.0	82.5	39.5	9.7	83.5	45.0	.....
11	162.5	186.0	107.0	34.5	9.7	82.0	41.0	.....
12	a 217.0	186.0	251.5	34.5	8.3	77.5	39.0	.....
13	a 232.5	190.0	195.5	32.5	8.8	83.5	39.0	.....
14	250.0	a 197.5	146.5	25.5	10.0	73.5	40.0	.....
15	282.5	a 209.0	104.5	24.5	11.0	68.0	40.0	.....
16	295.0	216.5	93.0	24.5	12.0	71.5	39.0	.....
17	287.0	189.0	93.0	24.5	10.5	71.5	43.5	.....
18	244.5	172.0	72.0	19.5	11.0	69.0	45.0	.....
19	291.0	197.5	65.5	a 18.0	10.0	58.0	45.0	.....
20	181.5	209.0	62.5	17.5	9.7	48.0	48.0	.....
21	183.5	248.0	62.0	18.0	10.0	46.0	45.0	.....
22	203.5	235.0	67.5	17.5	11.0	40.0	45.0	.....
23	201.5	255.5	73.5	15.5	8.7	39.5	49.0	.....
24	248.0	246.5	74.0	16.5	10.5	41.5	45.0	.....
25	221.0	216.5	69.0	13.5	9.2	44.5	45.0	.....
26	201.5	189.5	a 60.5	10.0	9.2	a 45.5	51.0	.....
27	186.5	161.0	62.0	10.5	10.5	a 46.0	70.0	.....
28	163.5	163.5	47.5	8.3	11.0	47.0	27.5	.....
29	176.5	134.5	47.5	8.7	11.5	52.0	33.0	.....
30	205.0	119.5	47.5	9.2	17.5	54.5	21.0	.....
31	.....	a 104.0	.....	8.0	25.5	.....	36.0	.....

a Interpolated.

Daily discharge, in second-feet, of Milk River at Pendant d'Oreille Police Detachment, Alta., 1909–1916—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1911.								
1	516	412	362	a 1,069	76	67	184	114
2	638	345	274	a 817	88	a 66	191	116
3	458	311	286	600	86	a 67	327	137
4	286	257	265	543	92	a 673	309	154
5	155	219	259	414	101	a 1,047	268	147
6	216	211	262	356	113	a 1,210	266	142
7	282	227	240	289	174	a 1,098	257	134
8	254	221	212	255	178	a 938	236	b 129
9	254	345	201	213	184	a 860	219	.....
10	220	352	176	194	188	a 843	197	.....
11	246	258	194	178	181	a 732	190	.....
12	406	254	205	159	174	a 623	177	.....
13	617	246	195	132	161	507	174	.....
14	431	236	181	129	150	367	163	.....
15	329	252	169	126	153	302	157	.....
16	272	320	160	111	148	256	166	.....
17	254	a 774	151	98	115	239	151	.....
18	254	a 1,118	140	97	94	214	147	.....
19	246	a 859	130	99	89	203	144	.....
20	261	a 612	132	101	84	199	139	.....
21	317	506	139	99	79	191	139	.....
22	277	434	139	106	78	199	133	.....
23	412	350	142	111	75	214	140	.....
24	478	318	a 719	109	75	174	136	.....
25	501	331	a 688	106	74	174	135	.....
26	469	346	a 1,541	101	74	184	133	.....
27	422	347	a 1,331	97	76	214	128	.....
28	496	362	a 1,014	92	75	230	122	.....
29	512	388	a 863	88	74	222	115	.....
30	490	393	a 702	84	71	207	115	.....
31	.....	403	.....	80	70	.....	115	.....
1912.								
1	.....	286	214	72	120	35	92	89
2	.....	306	220	102	127	35	81	93
3	.....	264	211	123	118	38	76	92
4	.....	257	195	137	113	53	76	94
5	.....	250	187	136	109	69	70	96
6	.....	294	182	141	106	66	67	101
7	.....	268	164	151	88	50	66	98
8	.....	250	144	159	c 99	63	70	125
9	.....	223	144	162	107	71	78	104
10	.....	210	144	162	99	68	92	c 94
11	.....	216	132	163	100	66	100	85
12	.....	219	130	169	70	66	103	84
13	.....	219	121	146	52	49	111	84
14	.....	216	126	137	46	49	97	78
15	.....	216	139	121	48	53	94	110
16	.....	216	132	136	48	50	94	111
17	.....	223	112	122	50	53	87	.....
18	.....	230	117	102	54	47	75	.....
19	.....	216	112	103	66	48	85	.....
20	.....	223	c 108	103	66	45	72	.....
21	.....	250	c 101	100	78	55	71	.....
22	.....	286	c 95	121	c 65	64	77	.....
23	.....	940	c 90	126	53	77	82	.....
24	.....	1,189	c 86	197	48	90	79	.....
25	.....	637	c 79	166	61	91	76	.....
26	.....	492	c 73	176	50	93	80	.....
27	.....	372	c 68	175	41	94	73	.....
28	318	304	c 64	164	40	90	c 74	.....
29	326	296	57	141	43	91	77	.....
30	330	289	64	114	41	89	85	.....
31	.....	266	.....	106	37	.....	88	.....

a Estimated. b Ice conditions. c Interpolated.

Daily discharge, in second-feet, of Milk River at Pendant d'Oreille Police Detachment, Alta., 1909–1916—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1913.								
1	.....	b40	482	566	566	82	37	40
2	.....	b65	368	533	492	68	35	35
3	.....	b85	332	503	447	65	33	31
4	.....	b140	323	447	296	61	31	33
5	.....	b300	328	431	252	70	31	40
6	.....	b560	425	368	203	59	29	46
7	.....	b325	296	342	165	50	30	47
8	.....	b543	296	296	169	65	30	53
9	.....	b744	270	287	80	70	30	61
10	.....	981	337	218	128	63	25	72
11	.....	1,011	332	214	a119	56	27	59
12	.....	1,147	292	323	a111	74	27	59
13	.....	1,588	323	318	a 103	146	25	56
14	.....	1,497	475	296	198	169	25	53
15	.....	1,451	540	232	93	119	26	63
16	.....	1,315	580	225	70	91	25	106
17	.....	1,064	503	207	91	72	25	146
18	.....	892	464	189	84	656	a 27	a 134
19	.....	951	677	176	80	200	28	125
20	.....	907	634	200	78	116	29	93
21	.....	1,049	929	214	70	93	29	87
22	.....	981	759	210	78	80	32	80
23	.....	877	627	200	80	70	31	76
24	.....	751	566	252	72	61	36	70
25	.....	559	600	203	61	53	39	68
26	.....	431	663	189	70	49	36	70
27	.....	347	527	256	66	41	37	76
28	.....	373	559	278	61	37	47	78
29	.....	420	586	447	61	36	46	80
30	.....	600	614	685	70	34	44	82
31	.....	.....	580	.....	101	40	.....	87
1914.								
1	.....	211	119	86	93.0	1.60	30.0	16.8
2	.....	206	119	86	56.0	0.48	23.0	20.0
3	.....	252	127	77	60.0	0.48	19.2	25.0
4	.....	421	132	70	68.0	0.32	18.4	79.0
5	.....	415	137	62	50.0	0.16	18.4	84.0
6	.....	440	150	106	43.0	0	19.2	91.0
7	.....	618	182	117	42.0	0	19.2	96.0
8	.....	767	171	84	34.0	0	21.0	103.0
9	.....	531	180	77	25.0	0	17.6	133.0
10	.....	427	201	81	27.0	0	20.0	111.0
11	.....	390	180	93	25.0	0	20.0	103.0
12	.....	475	163	101	25.0	0	20.0	98.0
13	.....	498	158	86	24.0	0	18.4	84.0
14	.....	481	160	86	19.2	0	43.0	103.0
15	252	684	162	77	17.6	0	34.0	111.0
16	224	565	160	86	17.6	0	42.0	126.0
17	198	427	150	84	17.6	0	28.0	174.0
18	215	354	136	133	17.6	2.0	20.0	419.0
19	198	346	135	111	b17.6	6.5	21.0	486.0
20	53	294	148	70	b17.6	13.6	21.0	319.0
21	101	235	134	77	17.6	9.0	23.0	b286.0
22	211	210	138	77	17.6	16.0	23.0	244.0
23	220	184	146	68	20.0	16.0	25.0	236.0
24	175	280	164	53	17.6	50.0	26.0	232.0
25	37	226	160	77	6.1	53.0	28.0	219.0
26	186	158	150	70	4.1	36.0	23.0	207.0
27	75	163	130	62	2.5	30.0	20.0	186.0
28	62	187	117	50	2.5	25.0	19.2	132.0
29	81	160	101	58	2.5	25.0	18.4	103.0
30	354	133	96	79	2.2	26.0	18.4	92.0
31	262	.....	93	.....	2.0	30.0	.....	81.0

a Interpolated. b Estimated.

NOTE.—Shifting control Apr. 11 to May 26. No flow Aug. 6–17.

Daily discharge, in second-feet, of Milk River at Pendant d'Oreille Police Detachment, Alta., 1909–1916—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1915.								
1	.....	311	86	144	488	502	87	158
2	.....	301	86	144	429	418	102	166
3	.....	325	86	232	375	302	104	171
4	.....	700	91	261	325	302	128	174
5	.....	845	277	709	375	293	209	174
6	.....	910	277	1,866	350	258	764	187
7	.....	572	256	1,600	402	220	386	202
8	.....	373	201	1,176	375	187	263	199
9	.....	325	172	718	316	157	216	205
10	.....	269	155	367	335	143	187	219
11	.....	229	155	325	258	138	183	219
12	.....	215	134	248	202	130	199	209
13	.....	185	129	492	258	130	275	202
14	.....	169	141	337	220	130	271	187
15	.....	172	155	287	231	128	267	205
16	[a]70	169	205	277	302	136	242	202
17	95	155	399	454	258	143	234	202
18	120	155	530	337	220	133	220	199
19	240	152	492	379	193	126	202	199
20	450	144	454	426	258	187	187	192
21	1,400	124	440	507	620	174	166	174
22	1,080	122	355	484	345	157	171	171
23	1,000	117	325	392	258	202	166	163
24	1,250	122	256	355	250	187	158	158
25	1,150	117	219	252	231	171	158	158
26	[a]700	106	198	282	220	157	155	158
27	277	104	169	1,649	213	157	149	152
28	287	106	152	1,123	209	116	158	133
29	331	104	141	738	297	111	160	133
30	325	95	129	843	527	100	160	140
31	343	.....	122	.....	583	89	.....	133

[a] Interpolated.

Monthly discharge of Milk River at Pendant d'Oreille Police Detachment, Alta., 1909–1915.

[Drainage area, 2,169 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1909.						
August 5–31	249	81	121	0.056	0.06	6,480
September	86	66	76	.035	.04	4,522
October	94	71	85	.039	.05	5,226
November 1–20	138	90	110	.051	.04	4,363
The period	.....	.....	.....	.....	.19	20,591
1910.						
April	295	129.0	189.0	.087	.10	11,264
May	256	104.0	186.0	.086	.10	11,437
June	252	48.0	90.0	.041	.05	5,343
July	57	8.0	29.0	.013	.02	1,777
August	26	6.4	10.8	.005	.01	664
September	84	21.0	22.1	.010	.01	1,315
October	65	21.0	46.8	.022	.03	2,878
November 1–8	53	31.5	43.7	.020	.01	693
The period	.....	.....	.....	.....	.33	35,371

Monthly discharge of Milk River at Pendant d'Oreille Police Detachment, Alta., 1909–1915—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1911.						
April	638	155	366.0	0.169	0.19	21,779
May	1,118	211	419.0	.193	.22	25,763
June	1,541	130	382.0	.176	.20	22,731
July	1,069	80	228.0	.105	.12	14,019
August	188	70	111.0	.051	.06	6,825
September	1,210	66	417.0	.192	.21	24,813
October	327	115	176.0	.081	.09	10,822
November 1–8	153	114	135.0	.062	.02	2,146
The period					1.11	128,898
1912.						
April 28–30	330	318	325.0	.149	.02	1,934
May	1,189	210	326.0	.150	.17	20,045
June	220	57	127.0	.059	.07	7,557
July	197	72	136.0	.062	.07	8,362
August	127	37	72.4	.033	.04	4,452
September	94	35	63.6	.029	.03	3,784
October	111	66	82.2	.038	.04	5,054
November 1–16	125	78	96.1	.044	.03	3,050
The period					.47	54,238
1913.						
April	1,588	40	733.0	.337	.38	43,617
May	929	270	493.0	.227	.26	30,313
June	685	176	310.0	.143	.16	18,446
July	566	61	146.0	.067	.08	8,977
August	656	34	95.0	.044	.05	5,841
September	47	25	31.7	.015	.02	1,886
October	146	31	71.2	.033	.04	4,378
The period					.99	113,458
1914.						
March 15–31	354	37.0	171.0	.079	.05	5,760
April	767	133.0	358.0	.165	.18	21,302
May	201	93.0	145.0	.067	.08	8,916
June	133	50.0	81.0	.037	.04	4,820
July	93	2.0	26.0	.012	.01	1,599
August	53	0	11.0	.005	.01	676
September	43	17.6	23.0	.011	.01	1,369
October	486	16.8	155.0	.071	.08	9,531
The period					.46	53,973
1915.						
March 16–31	1,400	70	570	.263	.16	18,089
April	910	95	260	.120	.13	15,471
May	530	86	226	.104	.12	13,896
June	1,866	144	580	.267	.30	34,512
July	620	193	320	.148	.17	19,676
August	502	89	187	.086	.10	11,498
September	764	87	211	.097	.11	12,555
October	219	133	179	.083	.10	11,006
The period					1.19	136,703

Mean monthly discharge, in second-feet, of Milk River at Pendant d'Oreille Police Detachment, Alta., 1909–1915.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total. in acre-feet.
1909	.....	.....	.....	.....	.....	[a]121	76	85	[b]110	[b]21,551
1910	.....	189	186	90	29	10	22	47	[b]44	35,371
1911	.....	366	419	382	228	111	417	176	[b]135	128,898
1912	.....	[b]325	326	127	136	72	64	82	[b]96	54,238
1913	.....	733	493	310	146	95	32	71	.....	113,458
1914	[b]171	358	145	81	26	11	23	155	.....	53,973
1915	[b]570	260	226	580	320	187	211	179	.....	136,703
Average	.....	381	299	262	148	87	121	114	.....	93,681
Average run-off, acre-feet	.....	22,671	18,385	15,590	9,100	5,349	7,200	7,010	.....	85,305
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	39

[a] Average for part of month, assumed as monthly mean.
[b] Incomplete record not included in average.

MILK RIVER AT EASTERN CROSSING OF INTERNATIONAL BOUNDARY, MONTANA.

LOCATION.—In NE. ¼ sec .6, T. 37 N., R. 9 E. Montana principal meridian, at international boundary, 30 miles north of Rudyard, Hill County, Mont., and 37 miles south of Manyberries, Alta., the nearest railway stations. (See Pl. X, *B*.)

DRAINAGE AREA.—2,514 square miles (measured by engineers, Reclamation Service, Department of the Interior, Canada).

RECORDS AVAILABLE.—April 1, 1913, to December 31, 1917. From August 7, 1909, to April 1, 1913, station was maintained 1,000 feet upstream by Reclamation Service, Department of the Interior, Canada.

GAGE.—Gurley printing gage installed September 18, 1917, on right (south) bank, and referred to two staff gages, one inside in well, and one outside in trench. The station maintained by Canada from August 7, 1909, to April, 1913, was equipped with a staff gage and cable and was 1,000 feet upstream. Kennedy Coulee, a small dry coulee, is tributary between the two locations. This was made a joint international station on April 1, 1913, when a staff gage was installed on the left (north) bank 200 feet below the present gage. This gage was used until August 13, 1913. Gages previously used as follows: April 1 to August 13, 1913, staff gage on left (north) bank, 200 feet below present gage; August 13, 1913, to March 22, 1917, Gurley printing gage referred to staff gage in river 10 feet below gage house; April 9 to June 13, 1917, several temporary gages were used, but all readings have been referred to the staff gage at the site of the one used August 13, 1913, to March 22, 1917; June 14 to September 18, 1917, readings on a staff gage at present site. Zero of gage on north bank was 2,696.58 feet sea level; that of present gage on south bank is 2,698.92 feet sea level. Staff gages read and automatic gages attended to by Frank Galloway.

DISCHARGE MEASUREMENTS.—Made from cable or by wading 100 feet below cable.

CHANNEL AND CONTROL.—A bar composed of heavy boulders, gravel, and sand makes a decided riffle at medium and low stages, and shifts frequently.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 9.60 feet April 9, 1917 (discharge, 4,860 second-feet); channel reported dry August 3–17, 22, 23, 1914. (See hydrograph, Pl. XII.)

ICE.—Stage-discharge relation seriously affected by ice during winter months. Short periods of open channel conditions may occur during floods.

DIVERSIONS.—A few small diversions on the headwaters and tributaries.

REGULATION.—Low-water flow materially increased by water from United States Reclamation Service St. Mary canal during July, August, and September, 1917.

ACCURACY.—Stage-discharge relation not permanent. Frequent discharge measurements indicate shifts. Gage height-record is good. Discharge records good.

Discharge measurements of Milk River at eastern crossing of international boundary, 1910–1917.

Date.	Made by—	Gage height.	Discharge.
1910.		*Feet.*	*Sec.-ft.*
Apr. 14	F. H. Peters	2.62	238
22	N. M. Sutherland	2.49	204
27	do	2.43	178
May 6	do	2.40	159
13	do	2.37	155
24	do	2.72	252
June 4	do	2.26	113
14	do	2.55	201
27	do	1.97	60.3
July 6	do	1.86	44.4
11	F. H. Peters	1.74	35.7
14	N. M. Sutherland	1.68	26.6
24	do	1.44	9.57
Aug. 1	do	1.31	5.57
13	do	1.24	2.71
14	do	1.28	3.77
25	L. J. Gleeson	1.26	4.03
Sept. 19	G. H. Whyte	1.91	54.6
Oct. 2	do	1.90	46.8
13	do	1.84	36.2
26	do	1.86	40.5
Nov. 11	do	1.71	24.8
1911.			
Apr. 21	N. M. Sutherland	2.85	270.35
May 9	do	2.84	255.97
31	J. E. Degnan	3.22	383.57
June 20	do	2.42	132.30
July 14	do	2.40	140.92
Aug. 14	do	2.54	154.46
Sept. 26	do	2.64	218.48
Oct. 29	do	2.20	115.76
1912.			
Apr. 30	J. E. Degan	3.04	297.60
May 24	do	4.04	1,068.82
25	do	3.78	770.96
June 14	do	2.27	118.52
30	do	2.07	60.46
July 21	do	2.31	93.00
Aug. 8	do	2.14	74.20
24	do	1.98	53.20
Sept. 15	do	2.00	51.60
Oct. 2	do	2.18	75.80
28	do	2.20	67.40
1913.			
Apr. 26	J. E. Degan	3.58	572.0
28	do	3.26	403.0
May 16	do	3.45	508.0
18	J. B. Stewart	3.45	470.0
30	J. E. Degnan	3.70	518.0
June 18	do	2.71	205.0
July 8	do	2.72	165.0
22	J. B. Stewart	2.23	81.0
25	J. E. Degnan	2.16	84.0
Aug. 13	do	2.98	60.0
13	J. B. Stewart	2.95	59.0
Sept. 4	J. E. Degnan	2.56	34.0
18	do	2.42	22.0
Oct. 8	do	2.80	55.0
24	do	3.05	74.0
Nov. 7	do	2.97	55.0
9	W. A. Lamb	3.14	85.0
Dec. 24	do	2.95	14.7
1914.			
Mar. 21	W. A. Lamb	3.30	78.0
22	J. E. Degnan	3.25	113.0
23	do	3.64	203.0
Apr. 23	do	3.56	185.0
May 1	B. E. Jones	3.53	153.0
27	J. E. Degnan	3.35	120.0
29	B. E. Jones	3.27	112.0
June 16	J. E. Degnan	3.16	85.0
24	B. E. Jones	2.94	57.0
July 8	J. E. Degnan	2.83	40.0
14	B. E. Jones	2.92	40.0
14	do	2.91	40.0
28	J. E. Degnan	2.31	2.0
Aug. 13	do		.0
Sept. 1	F. R. Steinberger	2.60	15.6
4	W. A. Lamb	2.57	17.5
23	J. E. Degnan	2.64	18.3
Oct. 19	G. H. Whyte	4.13	449.0
30	B. E. Jones	3.31	102.0
Dec. 21	do	2.97	17.9
1915.			
Mar. 25, 26	W. H. Storey	4.03	454
Apr. 14	B. E. Jones	3.09	195
14	W. H. Storey	3.15	196
15	do	3.10	186
20	do	3.04	152
28	B. E. Jones	2.96	104
May 6	W. H. Storey	3.51	268
25	B. E. Jones	3.28	194
June 2	G. H. Whyte	3.51	198
11	W. H. Storey	3.94	388
17	B. E. Jones	3.85	341
28	W. H. Storey	5.54	1,488
July 9	B. E. Jones	3.95	337
26	W. H. Storey	3.70	259
Aug. 5	B. E. Jones	3.87	296
12	W. H. Storey	3.24	131
23	W. A. Lamb	3.27	145
30	W. H. Storey	3.09	104
Sept. 18	W. A. Lamb	3.75	222
20	W. H. Storey	3.60	211
Oct. 8	do	3.70	228
27	do	3.61	177
Nov. 22	W. A. Lamb	3.75	90
1916.			
Mar. 14	L. J. Gleeson	6.64	2,064
15	W. A. Lamb	5.51	1,190
23	L. J. Gleeson	4.20	766
31	do	3.69	413
Apr. 12	do	3.68	392
30	W. A. Lamb	3.36	231
May 5	H. W. Rowley	3.50	297
12	A. H. Tuttle	3.54	287
17	H. W. Rowley	3.50	248
June 12	do	4.37	722
14	A. H. Tuttle	4.81	939
July 7	H. W. Rowley	4.41	686
28	do	3.49	228
Aug. 17	do	3.54	251
Sept. 7	W. A. Lamb	4.67	971
13	H. W. Rowley	3.39	255
Oct. 2	H. W. Rowley and V. A. Newhall	3.34	143
Nov. 2	H. W. Rowley	3.35	171
1917.[a]			
Mar. 10	A. H. Tuttle	5.13	23
Apr. 26	J. C. Milligan	4.69	856
May 7	do	4.29	820
9	A. H. Tuttle	4.67	1,090
15	V. A. Newhall	4.83	1,200
25	A. H. Tuttle	4.32	886
June 6	do	4.14	689
13	P. A. Fetterly	4.62	856
14	do	3.47	1,550
21	A. H. Tuttle	2.38	534
July 30	P. A. Fetterly	1.70	249
Aug. 3	A. H. Tuttle	1.81	258
Sept. 19	P. A. Fetterly	1.24	138
Nov. 6	do	1.50	189
15	Jones and Lamb	1.19	114
Dec. 20	W. A. Lamb	[b] 1.59	57

[a] North gage read Mar. 10 to June 13; south gage read June 14 to December. [b] Ice present.

NOTE.—W. A. Lamb, B. E. Jones, J. B. Stewart, and A. H. Tuttle are engineers employed by the United States Government.

Daily discharge, in second-feet, of Milk River at eastern crossing of international boundary, 1909–1917.

Day.	Aug.	Sept.	Oct.	Nov.	Day.	Aug.	Sept.	Oct.	Nov.
1909.					1909.				
1	.....	91	59	86	16	135	60	72	.....
2	.....	86	60	86	17	124	59	72	.....
3	.....	81	60	85	18	116	65	80	.....
4	.....	76	60	85	19	108	76	80	.....
5	.....	76	62	83	20	100	76	80	.....
6	.....	76	60	85	21	93	76	80	.....
7	.....	76	61	83	22	114	67	80	.....
8	.....	76	64	85	23	139	67	82	.....
9	194	76	64	86	24	135	71	83	.....
10	185	76	64	85	25	128	71	85	.....
11	176	76	77	83	26	122	76	85	.....
12	167	76	76	.....	27	116	76	85	.....
13	159	80	76	.....	28	110	73	85	.....
14	150	82	64	.....	29	106	60	85	.....
15	141	71	64	.....	30	100	60	86	.....
					31	95	.....	86	.....

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1910.								
1	.....	196.0	149.5	55.0	5.5	12.3	45.0	37.5
2	.....	198.0	175.0	55.5	5.1	16.0	48.0	44.0
3	.....	203.0	134.5	54.0	5.1	17.5	52.0	47.0
4	.....	188.5	119.0	51.0	4.4	18.0	49.0	52.5
5	.....	173.5	111.0	55.0	3.2	42.0	51.5	46.0
6	.....	168.5	99.5	47.0	3.2	30.0	48.5	41.5
7	.....	154.0	92.5	47.0	3.7	33.5	49.0	68.5
8	.....	135.5	95.0	43.5	3.2	38.5	43.0	42.0
9	.....	125.0	107.0	40.0	3.7	43.5	39.0	68.5
10	.....	120.0	100.0	37.5	4.0	46.5	41.0	48.5
11	.....	132.0	92.5	40.5	3.7	48.0	38.5	41.5
12	.....	142.0	101.0	38.0	3.2	54.5	37.0	.....
13	.....	139.5	209.5	25.0	3.0	64.5	36.0	.....
14	237.6	152.0	197.5	26.5	3.7	68.0	38.0	.....
15	266.5	184.0	163.5	24.5	3.9	65.5	38.0	.....
16	257.5	191.5	133.0	25.0	4.0	65.5	36.0	.....
17	266.5	204.0	119.5	20.5	4.0	60.5	37.5	.....
18	271.5	172.5	110.5	18.5	3.9	55.5	37.5	.....
19	242.0	175.5	106.0	16.0	3.8	54.5	40.5	.....
20	212.0	202.5	115.0	15.0	3.7	53.5	43.0	.....
21	196.0	204.5	90.0	13.0	3.7	52.5	51.0	.....
22	193.0	274.5	88.5	12.5	3.7	42.5	42.5	.....
23	202.5	249.0	88.5	12.5	3.7	45.5	42.5	.....
24	217.5	264.0	85.5	10.0	3.7	41.0	42.5	.....
25	222.5	279.5	80.0	10.0	3.5	42.0	42.5	.....
26	211.5	246.5	73.0	9.7	4.5	44.5	42.5	.....
27	178.0	210.5	59.5	8.0	6.2	41.0	36.0	.....
28	169.0	183.5	54.0	7.5	6.8	38.5	39.5	.....
29	183.5	168.5	43.5	7.0	7.9	38.5	37.0	.....
30	189.5	163.0	47.5	5.5	9.5	41.5	40.5	.....
31	.....	130.5	.....	5.7	11.0	.....	44.5	.....

Daily discharge, in second-feet, of Milk River at eastern crossing of international boundary, 1909–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1911.									
1	.....	357	367	379	789	87	70	218	167
2	.....	373	323	334	853	78	71	194	101
3	.....	444	263	309	520	99	72	331	101
4	.....	373	235	289	469	107	582	312	229
5	.....	114	214	287	461	129	689	350	149
6	.....	161	170	279	399	142	1,409	278	207
7	.....	108	204	274	355	120	1,088	275	221
8	.....	280	214	275	291	164	1,068	275	.....
9	.....	227	256	269	229	159	809	278	.....
10	.....	252	286	240	218	180	660	281	.....
11	.....	227	306	212	213	195	646	259	.....
12	.....	214	241	193	188	182	559	235	.....
13	.....	99	269	239	166	172	510	218	.....
14	.....	144	242	232	149	169	419	202	.....
15	.....	341	262	198	129	150	400	186	.....
16	255	315	310	190	126	140	325	174	.....
17	249	269	291	171	116	145	279	169	.....
18	244	244	a 1,013	162	115	128	253	166	.....
19	238	266	a804	144	108	114	235	162	.....
20	272	249	a630	135	110	109	233	159	.....
21	331	266	a 630	129	95	86	211	155	.....
22	309	317	420	275	110	79	222	149	.....
23	a 528	243	387	183	110	79	246	149	.....
24	a 981	275	347	171	112	79	245	151	.....
25	a 619	407	330	a 490	115	72	231	153	.....
26	a 611	407	369	a 519	111	76	216	146	.....
27	a 547	391	361	a 1,655	105	75	249	138	.....
28	a 516	355	358	a 948	98	75	218	134	.....
29	a 494	411	375	a 701	93	74	232	124	.....
30	392	414	395	a 549	90	75	218	136	.....
31	347	.....	392	.....	87	71	.....	132	.....
1912.									
1	.....	.....	280	319	64	88	38	74	77
2	.....	.....	241	290	73	87	35	74	77
3	.....	.....	257	249	74	86	37	75	77
4	.....	.....	221	226	88	100	47	74	77
5	.....	.....	224	194	101	75	60	73	77
6	.....	2,008	224	183	133	68	53	72	79
7	.....	1,382	241	165	128	61	57	72	82
8	.....	994	257	162	126	70	83	73	83
9	.....	744	241	147	120	58	78	74	83
10	.....	717	228	143	114	69	74	65	78
11	.....	602	253	132	110	72	69	68	72
12	.....	744	241	130	112	61	64	74	73
13	.....	1,150	257	123	112	59	61	87	74
14	.....	625	293	118	171	58	59	70	73
15	.....	633	253	132	142	53	57	70	72
16	.....	504	224	161	110	48	53	83	72
17	.....	395	215	138	105	49	43	86	.....
18	.....	341	194	115	114	49	49	90	.....
19	.....	280	188	113	103	53	49	90	.....
20	.....	280	191	107	100	53	47	87	.....
21	.....	288	191	95	96	57	51	86	.....
22	.....	297	194	93	91	53	53	82	.....
23	.....	301	221	84	91	59	61	84	.....
24	.....	322	909	76	88	57	72	84	.....
25	.....	322	791	68	122	47	72	84	.....
26	.....	333	618	66	176	45	77	82	.....
27	.....	341	608	64	135	44	77	79	.....
28	.....	314	567	62	133	43	81	78	.....
29	.....	297	382	60	124	46	77	78	.....
30	.....	297	356	59	116	40	78	77	.....
31	.....	.....	322	.....	98	39	.....	77	.....

a Estimated.

Daily discharge, in second-feet, of Milk River at eastern crossing of international boundary, 1909–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1913.										
1	.....	60	642	535	739	70	50	51	65	.....
2	.....	105	550	588	642	69	47	49	70	.....
3	.....	130	484	572	580	69	36	46	64	.....
4	.....	330	398	557	353	68	32	46	63	.....
5	.....	480	434	445	269	70	31	52	66	.....
6	.....	550	414	393	215	72	28	60	65	.....
7	.....	680	408	368	177	72	27	61	55	.....
8	.....	720	419	343	165	72	26	56	71	.....
9	.....	1,078	388	325	157	73	25	58	85	.....
10	.....	1,259	363	311	153	73	25	62	89	.....
11	.....	1,287	383	302	148	66	25	61	82	.....
12	.....	1,634	403	265	137	66	24	59	80	.....
13	.....	1,771	414	289	123	60	23	61	72	.....
14	.....	1,858	363	254	117	99	23	61	59	.....
15	.....	1,806	419	250	119	115	23	62	95	.....
16	.....	1,737	467	250	115	96	22	61	86	.....
17	.....	1,617	484	215	102	82	23	68	108	.....
18	.....	1,259	470	208	101	207	23	98	96	.....
19	.....	1,362	472	202	99	193	24	97	94	.....
20	.....	1,149	595	269	102	158	24	90	89	.....
21	.....	1,069	490	254	101	125	27	84	71	.....
22	.....	1,149	817	236	78	95	31	77	112	.....
23	.....	1,069	626	218	83	80	38	74	82	.....
24	.....	960	542	232	84	74	35	74	83	.....
25	.....	720	490	243	84	69	35	71	84	.....
26	.....	572	490	198	83	66	39	70	85	.....
27	.....	450	467	218	78	62	42	67	86	.....
28	.....	419	450	388	77	60	41	67	86	.....
29	.....	434	445	257	73	56	46	66	87	.....
30	.....	509	497	239	72	54	51	67	89	.....
31	.....	.....	503	.....	69	52	.....	56	.....	.....
1914.										
1	.....	a 639	148	90	61.0	1.00	17.8	10.7	98	35.0
2	.....	a 729	140	92	69.0	.35	20.0	12.1	92	36.0
3	.....	a 818	140	94	62.0	0	20.0	14.2	87	34.0
4	.....	a 908	148	85	49.0	0	16.3	38.0	83	30.0
5	.....	1,003	161	83	42.0	0	13.5	102.0	80	26.0
6	.....	925	171	171	40.0	0	12.1	145.0	80	24.0
7	.....	869	184	138	38.0	0	10.0	180.0	79	23.0
8	.....	1,009	208	108	38.0	0	8.5	221.0	77	23.0
9	.....	1,065	220	87	35.0	0	7.5	191.0	77	23.0
10	.....	1,009	205	77	33.0	0	6.7	194.0	79	24.0
11	.....	449	254	80	30.0	0	6.3	177.0	80	24.0
12	.....	366	254	124	27.0	0	10.0	145.0	80	25.0
13	.....	371	224	151	41.0	0	122.0	120.0	80	25.0
14	.....	376	177	191	74.0	0	83.0	116.0	89	27.0
15	.....	510	167	131	25.0	0	41.0	108.0	83	21.0
16	.....	583	153	87	21.0	0	29.0	112.0	68	21.0
17	.....	471	118	83	15.6	0	27.0	131.0	63	20.0
18	.....	355	140	82	13.5	26.0	27.0	191.0	60	17.0
19	.....	282	145	87	12.1	3.9	21.0	449.0	56	15.0
20	.....	325	148	108	12.1	.9	19.4	404.0	52	15.0
21	78	291	143	85	11.4	0.4	20.0	360.0	46	17.0
22	104	224	140	72	11.4	0	19.4	315.0	39	19.0
23	254	187	143	65	10.0	0	20.0	272.0	37	17.0
24	277	171	a 138	55	9.5	44.0	20.0	224.0	36	14.0
25	a 335	250	133	74	8.0	24.0	18.6	194.0	37	10.0
26	404	184	128	300	6.7	25.0	18.6	164.0	40	9.0
27	340	156	124	98	3.2	25.0	16.3	143.0	45	10.0
28	566	156	114	65	2.6	23.0	15.6	128.0	45	11.0
29	371	184	108	63	2.0	20.0	14.2	118.0	44	10.0
30	a 460	167	102	59	1.4	17.0	12.1	110.0	40	11.0
31	a 550	.....	98	.....	0.9	16.3	.....	104.0	.....	11.0

a Interpolated.

Daily discharge, in second-feet, of Milk River at eastern crossing of international boundary, 1909–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1915.										
1	.....	276	100	180	577	515	97	166	136	65
2	.....	245	100	265	458	432	100	166	143	63
3	.....	245	100	470	221	330	108	187	151	62
4	.....	262	102	365	302	262	180	189	153	62
5	.....	709	123	341	306	287	134	187	153	61
6	.....	891	239	1,220	355	287	287	189	156	59
7	.....	1,367	300	1,060	325	252	515	212	153	57
8	.....	754	236	948	339	212	309	230	153	55
9	.....	406	192	772	355	189	252	239	147	53
10	.....	359	178	614	338	166	215	224	136	51
11	.....	279	168	470	283	149	189	248	a 132	49
12	.....	290	148	948	259	137	171	252	a 128	48
13	.....	272	143	346	610	134	166	233	a 124	47
14	.....	202	155	470	279	136	180	212	120	45
15	a 60	187	223	380	197	145	218	215	116	40
16	70	189	253	355	194	192	215	224	112	39
17	80	194	226	365	302	259	210	224	108	39
18	120	189	540	525	252	171	197	221	104	37
19	250	180	485	525	218	215	205	213	101	37
20	450	168	403	498	207	325	210	205	98	35
21	a 850	164	349	554	359	166	194	192	94	38
22	a 1,400	153	312	614	432	145	184	180	90	33
23	a 1,400	143	296	498	359	145	178	164	88	29
24	a 1,750	141	274	360	276	180	171	162	86	27
25	a 800	136	229	327	242	166	168	162	84	25
26	400	130	205	295	230	134	168	164	81	a 25
27	380	119	197	525	194	137	164	162	79	a 25
28	360	166	180	948	205	126	164	151	77	a 25
29	320	100	173	644	432	114	164	145	73	a 25
30	275	100	168	610	406	109	168	137	72	a 25
31	a 250	.....	156	.....	432	103	.....	136	.....	a 25
1916.										
1	a 700	344	289	1,130	1,100	258	155	120	172	a 110
2	a 700	314	354	1,060	1,370	196	155	144	171	a 110
3	a 700	274	375	915	a 3,500	170	151	162	182	a 110
4	a 700	354	319	946	a 2,000	162	341	204	193	a 110
5	a 700	454	339	1,000	a 1,200	158	322	237	204	a 110
6	a 700	503	446	871	a 800	148	360	262	a 180	a 100
7	a 700	a 484	355	784	688	158	973	245	a 180	a 100
8	a 700	a 465	346	706	623	415	709	196	a 180	a 100
9	a 700	a 447	346	883	1,480	254	530	181	a 180	a 100
10	a 700	a 428	331	803	1,000	258	412	232	a 180	a 100
11	a 700	a 410	317	927	706	410	344	285	a 120	a 80
12	a 700	391	303	748	594	553	274	276	a 120	a 80
13	a 700	a 391	267	688	505	527	240	245	a 120	a 80
14	2,060	a 391	258	896	415	390	232	220	a 120	a 80
15	1,190	a 391	237	712	336	303	232	204	a 120	a 80
16	984	a 391	245	589	478	258	232	212	a 110	a 60
17	826	391	245	555	462	245	216	212	a 110	a 60
18	866	406	245	510	312	317	237	204	a 110	a 60
19	a 825	412	245	532	317	289	216	188	a 110	a 60
20	a 784	406	271	425	312	258	188	188	a 110	a 60
21	744	433	237	415	289	241	166	200	a 110	a 50
22	816	385	204	688	294	276	162	212	a 110	a 50
23	766	339	204	700	271	327	151	245	a 110	a 50
24	706	375	204	803	224	312	144	254	a 110	a 50
25	602	370	635	865	208	241	137	228	a 110	a 50
26	520	375	852	877	216	196	124	228	a 110	a 40
27	408	339	946	754	220	181	131	216	a 110	a 40
28	356	309	915	641	241	166	127	212	a 110	a 40
29	296	289	1,060	670	241	158	120	196	a 110	a 40
30	396	245	1,160	896	280	155	131	192	a 110	a 40
31	384	.....	1,070	.....	346	151	.....	173	.....	a 40

a Estimated.

Daily discharge, in second-feet, of Milk River at eastern crossing of international boundary, 1909–1917—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1917.								
1	a1,000	512	1,320	a240	264	a300	77	141
2	a900	485	946	238	264	310	77	96
3	a800	533	a908	a240	a267	299	74	198
4	a700	568	870	a260	270	324	70	171
5	a600	1,330	a570	a280	277	313	63	145
6	a1,500	1,200	271	a300	280	313	56	187
7	a3,500	757	505	a300	277	313	53	171
8	a4,000	713	458	306	277	a318	61	169
9	4,860	683	437	303	277	324	63	165
10	4,460	1,410	520	296	283	331	64	145
11	3,790	1,210	596	289	299	324	63	132
12	3,130	1,250	526	289	347	321	63	122
13	3,040	1,090	870	289	328	a325	64	118
14	2,370	1,090	1,530	286	328	328	68	a116
15	1,220	1,140	990	289	328	255	70	114
16	978	1,180	809	299	328	222	70	a105
17	705	1,220	623	306	317	210	70	96
18	735	1,240	492	306	310	167	70	96
19	735	1,300	431	296	306	116	61	a96
20	698	1,340	380	289	299	112	89	a96
21	839	647	375	289	293	104	77	a96
22	824	757	380	283	293	98	85	a96
23	713	794	359	277	286	215	56	96
24	1,080	847	347	273	277	165	50	a95
25	1,080	824	339	258	280	130	132	a95
26	817	757	321	247	280	100	91	94
27	632	757	286	247	280	85	87	a82
28	794	832	280	247	280	77	76	a70
29	691	1,100	270	252	280	79	94	a57
30	633	908	241	258	283	77	132	44
31	.....	946	.....	258	289	.....	152	.....

a Estimated.

NOTE.—1912: Shifting control May 25 to June 30.
1913: Stage-discharge relation affected by ice Apr. 1–10. Shifting-control method Apr. 22–28, May 12 to June 6, June 11–27, July 4–30, Aug. 13–25, and Oct. 8 to Nov. 8. Published discharge revised Apr. 21–30, May 13 to June 5, June 12–26, July 5–30.
1914: Shifting control Apr. 24 to May 26, and July 13–27.
1917: Shifting control Apr. 9 to May 30, June 7–13, and Nov. 10–26. Stage determined from north gage Mar. 9 to June 13 and from south gage from June 14 to Sept. 30.

Monthly discharge of Milk River at eastern crossing of international boundary, 1909–1917.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1909.						
August 9–31	194	93	131	0.052	0.04	5,976
September	91	59	74	.029	.03	4,403
October	86	59	73	.029	.03	4,489
November 1–11	86	83	85	.034	.01	1,855
The period					.11	16,723
1910.						
April 14–30	271.5	169.0	218.6	.089	.056	7,372
May	279.5	120.0	184.9	.076	.088	11,369
June	209.5	43.5	108.0	.044	.049	6,426
July	55.5	5.5	27.0	.011	.013	1,660
August	11.0	3.0	4.6	.002	.002	282
September	68.0	12.3	43.8	.018	.020	2,606
October	52.0	36.0	42.2	.017	.020	2,595
November 1–11	68.5	37.5	48.9	.019	.008	1,066
The period					.256	33,376
1911.						
March 16–31	981	238	433	.177	.10	13,751
April	444	99	285	.116	.13	16,959
May	1,013	170	363	.148	.17	22,320
June	1,655	129	348	.142	.16	20,707
July	853	87	230	.094	.11	14,142
August	195	71	116	.048	.06	7,133
September	1,409	70	422	.172	.19	25,111
October	350	124	200	.082	.09	12,298
November 1–7	229	101	168	.069	.02	2,332
The period					1.03	134,753
1912.						
April 6–30	2,008	280	580	.237	.22	28,782
May	909	188	318	.130	.15	19,553
June	319	59	136	.056	.06	8,093
July	176	64	113	.046	.05	6,948
August	100	39	59.6	.024	.03	3,665
September	83	35	60.4	.024	.03	3,594
October	90	65	78.1	.032	.04	4,802
November 1–16	83	72	76.6	.031	.02	2,432
The period					.60	77,869
1913.						
April	1,858	60	941	.384	.43	56,993
May	817	363	477	.195	.22	29,330
June	588	198	314	.128	.14	18,684
July	739	69	177	.072	.08	10,883
August	216	52	85	.035	.04	5,214
September	51	22	32	.013	.01	1,874
October	98	46	66	.027	.03	4,027
November	112	55	81	.033	.04	4,820
The period					.99	130,825
1914.						
March 21–31	566	78.0	340.0	.135	.055	7,416
April	1,065	156.0	501.0	.199	.222	29,812
May	254	98.0	158.0	.063	.073	9,715
June	300	55.0	103.0	.041	.046	6,129
July	74	.9	26.0	.010	.012	1,599
August	44	.0	7.3	.003	.003	449
September	122	6.3	23.0	.009	.010	1,369
October	449	10.7	168.0	.067	.077	10,330
November	98	36.0	65.1	.026	.029	3,868
December	36	9.0	20.2	.008	.009	1,230
The period					.536	71,917

Monthly discharge of Milk River at eastern crossing of international boundary, 1909–1917—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1915.						
March 15–31	1,750	60	542	0.216	0.137	18,271
April	1,367	100	301	.120	.134	17,911
May	540	100	224	.089	.103	13,773
June	1,220	180	550	.219	.244	32,727
July	610	194	321	.127	.146	19,676
August	515	103	204	.081	.093	12,543
September	515	97	196	.078	.087	11,663
October	252	136	193	.077	.089	11,867
November	156	72	115	.046	.051	6,843
December	65	25	42	.017	.020	2,582
The period	.....	.....	.....	.....	1.103	147,856
1916.						
January	.....	.....	18	.007	.01	1,107
February	.....	.....	1,130	.449	.48	65,000
March	2,060	296	730	.290	.33	44,886
April	503	245	384	.153	.17	22,850
May	1,160	204	439	.175	.20	26,993
June	1,130	415	766	305	.34	45,580
July	[a]3,500	208	678	.270	.31	41,689
August	553	148	262	.104	.12	16,110
September	973	120	264	.105	.12	15,709
October	285	120	212	.084	.10	13,035
November	204	.....	[a]136	.054	.06	8,093
December	.....	.....	[a]72	.029	.03	4,427
The year	.....	.....	.....	.....	2.27	305,479
1917.						
January	.....	.....	[b]45	.....	.....	2,767
February	.....	.....	[b]35	.....	.....	1,944
March	.....	.....	[b]204	.....	.....	12,543
April	4,860	600	1,594	.....	.....	94,849
May	1,410	485	949	.....	.....	58,352
June	1,530	241	575	.....	.....	34,215
July	306	238	277	.....	.....	17,032
August	347	264	292	.....	.....	17,954
September	331	77	222	.....	.....	13,210
October	152	50	77	.....	.....	4,735
November	198	44	117	.....	.....	6,962
December	.....	.....	53	.....	.....	3,259
The year	.....	.....	.....	.....	.....	267,822

[a] Discharge estimated.

[b] Estimated by comparison with records at Milk River and Havre. As part of the discharge at this point is water from the United States Reclamation Service St. Mary canal, the run-off on the area has not been computed.

NOTE.—Discharge for the months January, February, March, November and December, in 1916, estimated by comparison with discharge of Milk River at Milk River and Havre.

Mean monthly discharge, in second-feet, of Milk River at eastern crossing of international boundary, 1909–1917.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total in acre-feet.
1909	.....	.....	.....	.....	.....	.....	.....	a131	74	73	b 85	.....	b18,802
1910	.....	.....	.....	b 219	185	108	27	5	44	42	b 49	.....	b 33,376
1911	.....	.....	b433	285	363	348	230	116	422	200	b 168	.....	134,753
1912	.....	.....	.....	a 580	318	136	113	60	60	78	b 77	.....	83,599
1913	.....	.....	.....	941	477	314	177	85	32	66	81	c 37	137,073
1914	.....	.....	b 340	501	158	103	26	73	23	168	65	20	71,917
1915	.....	.....	b 542	300	224	550	321	204	196	193	115	42	147,796
1916	c 18	c1,130	c 730	384	439	766	678	262	264	212	c 136	c 72	305,479
1917	c 45	c 35	c 204	1,594	949	575	d 277	d 292	d 222	77	117	53	267,822
Average	32	194	467	655	389	362	225	117	139	123	103	45	146,769
Average run-off, acre-foot	1,968	10,774	28,715	38,975	23,919	21,540	13,835	7,194	8,271	7,563	6,129	2,766	171,649
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	68

a Average for part of month assumed as monthly average.
b Incomplete record not included in average.
c Estimated.
d Not used in average as flow included water from St. Mary River.

Duration of flow (number of days in the year) of Milk River at eastern crossing of international boundary, 1909–1917.

Flow (second-feet).	1909	1910	1911	1912	1913	1914	1159	1916	1917
4,000	.....	.....	.....	.....	.....	.....	.....	.....	3
3,000	.....	.....	.....	.....	.....	.....	.....	1	7
2,000	.....	.....	.....	1	.....	.....	1	3	8
1,500	.....	.....	1	1	6	.....	3	3	10
1,400	.....	.....	2	1	6	.....	3	4	11
1,300	.....	.....	2	2	7	.....	4	5	15
1,200	.....	.....	2	2	10	.....	5	6	21
1,100	.....	.....	2	3	12	.....	5	10	25
1,000	.....	.....	5	4	13	4	6	15	29
900	.....	.....	7	4	16	6	9	24	36
800	.....	.....	10	7	17	8	12	36	46
700	.....	.....	12	10	20	9	15	61	58
600	.....	.....	19	11	24	10	20	69	66
500	.....	.....	27	19	36	14	28	80	74
450	.....	.....	27	19	36	14	28	80	74
400	.....	.....	39	25	40	20	44	100	79
350	.....	.....	39	25	40	20	44	100	79
300	.....	.....	73	25	74	31	72	143	83
250	.....	.....	73	25	74	31	72	143	83
200	.....	22	144	25	94	46	134	210	171
150	6	45	174	25	101	69	198	243	174
100	21	66	213	25	115	107	246	275	181
90	24	69	220	25	127	115	250	285	188
80	53	73	222	25	148	134	255	290	191
70	76	74	236	25	170	142	260	290	201
60	93	81	236	25	200	151	266	295	210
50	95	97	236	25	213	155	271	300	214
40	95	138	236	25	220	167	276	306	214
30	95	158	236	25	228	181	283	306	214
20	95	163	236	25	244	212	292	306	214
10	95	176	236	25	244	251	292	306	214
9	95	178	236	25	244	253	292	306	214
8	95	179	236	25	244	255	292	306	214
7	95	182	236	25	244	256	292	306	214
6	95	186	236	25	244	259	292	306	214
5	95	189	236	25	244	259	292	306	214
4	95	194	236	25	244	259	292	306	214
3	95	212	236	25	244	261	292	306	214
2	95	212	236	25	244	263	292	306	214
1	95	212	236	25	244	265	292	306	214
0	95	212	236	25	244	269	292	306	214

MILK RIVER AT HAVRE, MONT.

LOCATION.—In SW. ¼ SW. ¼ sec. 4, T. 32 N., R. 16 E., at highway bridge over Milk River at Havre, in Hill County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 15, 1898, to December 31, 1917.

GAGE.—Chain gage fastened to downstream rail of bridge. Owing to the formation of sand bars in the river, it has often been necessary to move gage from one end of the bridge to the other, but the datum has not been changed.

DISCHARGE MEASUREMENTS.—Made from highway bridge or by wading.

CHANNEL AND CONTROL.—Bed of stream composed of fine gravel and sand, shifting frequently. Both banks are overflowed at high stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 17.2 feet March 12, 1916 (discharge not known); minimum stage recorded, channel reported dry July 16–18, 1898; August 16–20, 1904; July 25, August 18–26, 1905; November 16 to December 31, 1906; July 28 to September 14, 1910; July 29 to August 22, 1914. (See hydrographs, Pls. XIII–XIV.)

ICE.—During the winter months the stream is completely frozen and the discharge is too small to determine except by discharge measurements. Periods of warm weather may cause sudden floods due to melting snow. At such times the open channel rating curve is applicable, except when an ice gorge forms below the gage.

DIVERSIONS.—A few small diversions on the headwaters and tributaries.

REGULATION.—During 1917 the St. Mary canal was in operation, and a total of 33,600 acre-feet was added to Milk River flow.

ACCURACY.—The United States Weather Bureau also maintained a station at this point and the gage is read by their observer or one of his sons. Frequent changes in the sand bars forming the control render a large number of discharge measurements necessary each year to insure good results. If one or two measurements are made each month the records are good; if fewer measurements are made the records are fair to poor.

Discharge measurements of Milk River at Havre, Mont., 1898–1917.

Date.	Made by—	Gage height.	Discharge.
1898.		*Feet.*	*Sec.-ft.*
Apr. 26	Roe Emery	5.70	1,701
May 24	do	2.80	1,306
June 29	C. C. Babb	1.95	171
July 29	do	1.40	145
Aug. 4	C. W. Ling	.60	118
13	do	.40	77
24	do	2.00	457
26	do	1.70	194
Sept. 5	do	1.20	106
24	do	.60	44
30	do	.80	31
Oct. 4	do	1.40	96
6	do	1.50	105
10	do	1.60	119
12	do	1.70	132
13	do	1.80	158
14	do	1.70	125
20	do	1.10	89
24	do	1.30	120
26	do	1.50	133
Nov. 1	do	1.40	115
14	do	1.10	64
15	do	1.20	84
16	do	1.10	86
17	do	1.10	92
18	do	1.10	83
1899.			
Apr. 20	Emery and Ling	3.20	1,410
28	C. W. Ling	2.20	807
May 3	do	1.90	732
12	do	2.60	1,087
16	do	2.50	911
22	do	3.50	1,657
29	do	3.40	1,653
June 3	do	2.90	1,126
10	do	2.80	1,209
15	do	2.30	661
20	do	2.00	586
28	do	1.90	588
July 3	do	1.40	353
7	do	1.20	298
11	do	1.25	314
17	do	.80	181
22	do	.60	150
27	do	.70	170
31	do	1.00	228
Aug. 3	do	1.10	252
5	do	1.40	379
11	do	.80	182
16	do	.50	111
19	do	.40	106
25	do	.60	137
28	do	.80	158
Sept. 2	do	.60	137
7	do	.30	99
12	do	.20	88
15	do	.30	96
21	do	1.50	360
25	do	1.90	221
30	do	1.50	122
Oct. 16	do	1.40	109
24	do	1.70	146
Nov. 6	do	2.40	368
1900.			
Apr. 21	C. W. Ling	2.90	242
26	do	3.30	327
27	Ling and Fortier	3.07	314
27	do	3.00	302
May 3	C. W. Ling	3.20	390
7	do	2.70	309
11	do	2.40	207
15	do	2.60	260
16	do	4.00	863
17	do	5.20	1,651
18	do	4.50	1,112
24	do	3.40	444
31	do	3.00	312
June 9	C. W. Ling	2.60	185
12	do	2.40	142
21	do	2.20	117
27	do	2.10	108
July 3	do	1.90	76
10	do	2.00	92
18	do	1.70	30
25	do	1.50	14
Aug. 3	do	1.40	17
4	C. W. Ling and Fortier	1.40	12
11	C. W. Ling	1.40	13
13	do	2.60	182
14	do	2.40	145
20	do	1.60	27
31	do	1.60	27
Sept. 4	do	1.50	23
5	do	1.70	48
8	do	2.00	80
10	do	2.50	142
17	do	1.90	50
22	do	2.20	97
Oct. 2	do	2.00	84
6	do	3.10	314
8	do	2.90	236
12	do	2.60	157
16	do	2.90	265
22	do	2.40	129
27	do	2.30	114
Nov. 2	do	2.30	96
10	do	2.00	63
1901.			
Mar. 9	L. H. Ling	5.00	1,016
11	do	4.90	1,006
14	do	4.35	664
15	do	5.15	1,272
18	do	4.70	818
23	do	3.90	511
28	do	3.80	458
Apr. 3	do	3.10	280
5	do	3.05	300
16	do	2.80	199
24	do	2.70	198
May 2	do	3.10	304
4	do	6.20	2,577
6	do	5.00	1,162
23	do	4.30	836
June 8	do	3.40	261
12	do	4.50	893
14	do	5.20	1,225
July 2	do	3.60	341
8	do	3.10	204
16	do	3.00	147
27	do	2.40	68
Aug. 8	do	2.20	37
19	do	2.00	23
29	do	1.70	13
Sept. 7	do	1.90	17
21	do	2.60	100
26	do	2.60	96
Oct. 9	do	2.50	102
16	do	2.50	80
26	do	2.50	72
Nov. 5	do	2.35	63
12	do	2.60	82
20	do	2.50	71
1902.			
Apr. 11	J. S. Baker	3.50	249
19	L. H. Ling	3.10	214
May 19	do	4.00	362
22	do	4.90	1,013
23	do	7.35	3,363
24	do	8.88	5,179
27	do	6.60	2,503
July 10	do	7.00	2,341
31	do	4.70	573
Aug. 8	do	4.10	387
26	do	4.20	427

Discharge measurements of Milk River at Havre, Mont., 1898–1917—Continued.

Date.	Made by—	Gage height.	Discharge.
1902.		*Feet.*	*Sec.-ft.*
Aug. 30	L. H. Ling	3.90	269
Sept. 11	do	3.60	192
17	do	3.80	240
23	do	3.90	226
30	do	4.00	229
Oct. 6	do	3.90	206
16	do	3.90	208
29	do	3.90	206
Nov. 4	L. V. Branch	3.77	205
1903.			
Apr. 4	L. H. Ling	5.90	1,130
13	do	5.60	1,034
22	do	5.40	895
24	J. S. Baker	5.18	912
24	do	5.18	841
May 4	L. H. Ling	4.63	588
13	F. M. Brown	4.70	599
13	do	4.70	552
16	L. H. Ling	4.16	388
25	do	5.90	1,736
27	C. T. Prall	6.25	1,987
28	L. H. Ling	7.22	2,784
29	C. T. Prall	8.30	3,705
30	L. H. Ling	8.51	4,135
June 24	A. E. Place	4.80	483
23	E. W. Myers	4.04	208
July 24	do	3.93	152
28	do	4.35	279
Aug. 18	A. E. Place	4.21	288
28	J. H. Sloan	5.35	974
Sept. 29	do	3.60	118
Nov. 4	W. B. Freeman	3.62	107
1904.			
Apr. 12	A. E. Place	7.78	2,866
May 5	do	5.18	588
19	L. R. Stockman	4.37	359
26	do	4.43	289
June 4	E. C. Murphy and W. B. Freeman.	4.93	435
30	Robert Follansbee	3.47	95
July 18	do	3.02	44
Aug. 1	W. B. Freeman	2.80	12
10	do	2.45	3
1905.			
Apr. 7	L. R. Stockman	3.30	49
May 2	H. M. Morse	3.85	85
6	do	3.59	71
June 5	do	3.44	45
July 11	W. B. Freeman	3.15	17
31	H. M. Morse	3.85	113
Aug. 1	do	3.68	55
1906.			
Apr. 1	W. B. Freeman	4.07	115
20	Freeman and Morse	3.77	68
May 2	W. B. Freeman	3.39	42
27	do	4.18	134
30	do	5.00	414
30	do	5.62	951
31	do	6.43	1,130
June 9	Freeman and Hartman	8.40	2,630
9	do	8.80	3,120
14	Freeman and Morse	5.65	1,030
July 18	W. S. Hartman	3.39	65
Aug. 26	do	2.60	5
Oct. 28	Follansbee and Richards	2.33	2
1907.			
Apr. 2	Follansbee and Pierson	5.75	993
2	do	5.93	1,170
5	do	9.72	3,520
5	do	9.35	3,100
6	J. B. Pierson	9.04	2,910
12	do	6.30	1,300
19	do	5.16	622
25	do	4.60	356
1907.			
May 4	J. B. Pierson	4.27	309
15	do	4.93	601
21	Robert Follansbee	5.13	765
23	J. B. Pierson	4.94	650
27	do	4.79	487
31	do	4.53	437
June 15	do	4.75	554
24	do	6.00	1,260
26	do	8.29	2,860
27	Follansbee and Pierson	5.75	1,270
July 15	J. B. Pierson	4.45	404
19	do	4.18	280
Aug. 2	J. B. Pierson	3.57	128
22	do	3.19	57
29	do	3.07	42
Sept. 12	do	3.44	92
26	Robert Follansbee	3.93	197
Oct. 19	Follansbee and Stewart	3.32	67
1908.			
Apr. 4	Stewart and Huch	4.20	222
4	do	4.35	260
25	A. F. Huch	4.39	348
May 22	do	4.70	478
June 4	do	5.11	571
27	do	5.10	840
Aug. 5	do	4.01	204
Oct. 27	do	3.97	144
1909.			
Apr. 19	Stewart and Lamb	4.66	286
May 10	W. A. Lamb	5.90	1,030
14	do	5.90	1,020
24	do	10.35	3,940
June 4	do	6.50	723
10	do	6.25	630
July 3	do	6.09	417
24	do	5.30	177
Aug. 21	do	5.10	90
Sept. 12	Hoyt and Stewart	5.50	71
22	W. A. Lamb	5.45	64
Oct. 2	do	5.50	64
22	do	5.62	84
Nov. 18	do	5.60	27
1910.			
Mar. 30	Raymond Richards	6.25	333
Apr. 30	M. E. McChristie	5.73	180
May 7	do	5.70	170
June 20	do	5.29	72
July 18	W. A. Lamb	4.48	5.2
1911.			
Apr. 15	W. A. Lamb	6.98	541
28	J. C. Beebe	7.29	657
May 3	do	6.30	135
3	do	6.60	304
6	do	6.16	244
23	do	7.13	579
30	do	6.72	366
June 17	do	6.11	174
26	do	7.22	745
28	do	9.11	2,030
July 4	do	7.30	715
8	do	6.70	334
27	do	5.83	86
Aug. 2	do	5.72	78
31	R. Richards	5.48	42
Oct. 12	W. A. Lamb	6.50	253
1912.			
Apr. 3	W. A. Lamb	11.96	4,860
May 16	R. R. Randall	6.57	398
June 13	do	6.07	205
July 8	do	5.88	117
24	do	5.92	106
Aug. 26	do	5.50	48
Nov. 11	do	6.01	123

Discharge measurements of Milk River at Havre, Mont., 1898–1917—Continued.

Date.	Made by—	Gage height.	Discharge.
1913.		*Feet.*	*Sec.-ft.*
Mar. 19	R. R. Randall	7.35	92
Apr. 30	J. B. Stewart	7.25	572
May 17	do	7.50	756
June 5	do	7.05	467
29	do	7.13	411
July 3	do	7.15	539
9	do	6.50	206
12	do	6.35	175
21	do	5.94	95
26	do	5.78	73
Aug. 8	do	5.58	46
12	do	5.67	42
Sept. 19	W. A. Lamb	4.94	10
Oct. 30	do	5.70	61
1914.			
Mar. 20	W. A. Lamb	6.32	174
Apr. 30	B. E. Jones	6.41	174
May 28	do	5.90	106
30	do	5.91	95
June 23	do	5.81	84
July 13	do	5.18	15
Oct. 29	do	5.98	139
Dec. 22	do	5.54	12.4
1915.			
Feb. 21	W. A. Lamb	.....	4.2
Apr. 13	B. E. Jones	6.52	292
23	do	6.04	154
27	do	5.71	105
May 26	do	6.42	217
June 17	do	7.08	398
July 8	do	7.28	402
Aug. 4	do	7.42	417
7	do	6.82	242
23	W. A. Lamb	7.19	310
Sept. 19	do	6.81	253
Nov. 22	do	6.10	54
1916.		*Feet.*	*Sec.-ft.*
Jan. 16	W. A. Lamb	5.45	12.6
29	do	.....	7.5
Mar. 17	do	9.98	1,060
Apr. 23	A. H. Tuttle	6.66	265
May 4	do	7.03	356
12	do	6.75	249
27	do	8.13	1,090
June 15	do	8.68	1,020
July 17	do	7.75	640
27	do	8.49	1,100
Aug. 23	do	6.81	270
Sept. 7	W. A. Lamb	7.64	619
12	do	7.20	428
Oct. 8	A. H. Tuttle	7.05	337
Nov. 5	Tuttle and Lamb	6.54	195
Dec. 22	W. A. Lamb	6.48	47
1917.			
Mar. 5	A. H. Tuttle	7.61	29
31	Tuttle and Anderson	10.9	2,330
Apr. 9	A. H. Tuttle	15.17	5,020
14	M. D. Anderson	11.9	4,410
20	W. A. Lamb	8.67	1,170
May 5	Tuttle and Anderson	8.27	953
23	A. H. Tuttle	7.93	1,050
26	do	8.10	1,130
June 8	do	7.91	769
19	do	8.01	704
22	do	7.75	607
Aug. 2	do	6.88	275
29	Heidel and Tuttle	7.06	282
Sept. 10	W. A. Lamb	7.33	381
22	do	6.42	129
Nov. 13	Lamb and Jones	6.60	151
Dec. 19	W. A. Lamb	6.41	56

NOTE.—1909: Nov. 18, ice 6 inches thick.
1911: May 3, two measurements; sand bar under gage. Gage heights of little value.
1913: Mar. 19, stage-discharge relation affected by ice.
1914: May 28, results questionable because of strong downstream wind. Dec. 22, stage-discharge relation affected by ice.
1915: Feb. 21, stream frozen solid at gage. Stage-discharge relation affected by ice Nov. 22.
1916: Jan. 16, 29, and Mar. 17, stage-discharge relation affected by ice.
1917: Mar. 5, Mar. 31, Apr. 9, and Dec. 22, stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Milk River at Havre, Mont., 1898–1917.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1898.								
1	.....	.....	2,375	280	90	66	11	99
2	.....	.....	2,318	280	90	66	11	99
3	.....	.....	2,546	240	93	88	49	99
4	.....	.....	2,375	165	88	99	71	99
5	.....	.....	2,204	165	88	88	77	99
6	.....	.....	1,976	152	90	104	88	99
7	.....	.....	1,862	165	90	88	88	99
8	.....	.....	1,634	125	88	77	88	99
9	.....	.....	1,520	125	77	66	88	110
10	.....	.....	1,406	11	77	55	93	99
11	.....	.....	1,406	0	77	66	99	99
12	.....	.....	1,235	0	77	66	110	99
13	.....	.....	1,121	0	66	44	125	110
14	.....	.....	1,178	44	66	44	110	99
15	.....	1,406	1,235	99	55	49	99	93
16	.....	1,406	1,634	100	55	49	99	93
17	.....	1,976	1,235	100	44	44	88	99
18	.....	1,805	1,121	100	44	44	77	104
19	.....	1,634	1,064	104	44	44	77	99
20	.....	2,432	1,235	132	44	38	77	.....
21	.....	1,748	1,349	165	44	33	66	.....
22	.....	1,520	1,064	140	33	33	82	.....
23	.....	1,520	950	140	33	33	99	.....
24	.....	1,349	893	950	893	27	93	.....
25	.....	1,178	893	280	437	33	110	.....
26	.....	836	836	280	182	33	110	.....
27	.....	1,007	722	200	140	33	125	.....
28	.....	950	608	152	99	33	110	.....
29	.....	1,064	437	117	82	22	110	.....
30	.....	950	200	104	66	11	110	.....
31	.....	950	.....	90	66	.....	99	.....
1899.								
1	.....	620	.....	.....	.....	140	110	98
2	.....	570	.....	.....	.....	140	98	98
3	.....	570	1,220	365	265	124	110	98
4	.....	570	.....	.....	.....	124	98	98
5	.....	570	.....	.....	365	110	98	365
6	.....	910	.....	.....	.....	110	90	365
7	.....	980	.....	295	.....	98	84	.....
8	.....	980	.....	.....	.....	110	98	.....
9	.....	910	.....	.....	.....	110	98	.....
10	.....	910	1,135	.....	.....	98	98	.....
11	.....	910	.....	312	183	98	90	.....
12	.....	910	.....	.....	.....	90	80	295
13	.....	945	.....	.....	.....	90	94	.....
14	.....	980	.....	.....	.....	90	94	.....
15	.....	980	785	.....	.....	98	98	.....
16	2,880	980	.....	.....	124	90	98	.....
17	2,580	980	.....	183	.....	110	90	.....
18	2,180	1,055	.....	.....	.....	124	84	.....
19	1,680	1,055	.....	.....	110	140	84	84
20	1,480	1,055	620	.....	.....	84	84	.....
21	1,480	1,055	.....	.....	.....	208	80	.....
22	1,347	1,262	.....	140	.....	235	90	.....
23	1,135	1,580	.....	.....	.....	235	84	.....
24	945	1,480	.....	.....	.....	208	84	.....
25	910	1,480	.....	.....	140	183	80	.....
26	910	1,055	.....	.....	.....	160	98	.....
27	845	1,135	.....	160	.....	140	98	208
28	755	.....	.....	.....	183	110	110	.....
29	725	1,680	.....	.....	.....	124	110	.....
30	620	.....	.....	.....	.....	140	110	.....
31	.....	.....	.....	235	.....	.....	98	.....

Daily discharge, in second-feet, of Milk River at Havre, Mont., 1898–1917—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1900.												
1					355	355	76	21	30	76	129	
2					438	315	76	12	21	76	129	
3					396	280	63	12	21	91	129	
4					315	216	63	12	21	109	109	
5					280	216	63	12	39	149	109	
6					248	216	63	12	39	355	109	
7					216	216	50	12	50	355	109	
8					189	189	50	8	76	280	109	
9					189	189	63	8	91	248	109	
10				485	169	149	76	8	169	216	76	
11				485	149	149	91	12	149	189	63	
12				640	129	149	50	232	149	189	109	
13				587	149	129	50	201	149	169	149	
14				587	149	129	39	149	76	169	109	
15				485	189	129	39	109	76	248	169	
16				438	820	129	39	76	63	280		
17				315	1,575	129	39	63	63	315		12
18				396	1,205	149	39	39	63	280		12
19				280	880	109	30	30	63	248		12
20				280	640	109	30	30	63	216		12
21				280	587	109	30	21	76	216		12
22				280	760	109	30	21	109	149		30
23				280	587	109	21	12	109	149		
24				355	485	91	21	12	91	129		
25				438	438	91	21	12	76	129		
26				438	396	109	21	12	76	129		
27				280	355	91	21	12	76	129		
28				355	280	91	30	12	63	129		
29				280	315	91	21	12	63	129		
30				315	280	76	21	12	76	109		
31					315		21	30		109		
1901.												
1				280	280	680	350	65	12	80	80	
2				280	280	480	350	50	12	80	80	
3				280	280	360	290	40	11	80	65	
4				230	2,272	360	260	40	11	80	65	
5				255	1,700	360	260	40	11	65	65	
6				255	1,100	360	230	40	12	65	65	
7				230	1,460	360	200	40	19	80	80	
8				180	730	360	200	40	23	80	80	
9				180	730	330	290	40	23	80	80	
10				180	540	330	350	40	23	95	80	
11			1,020	155	450	360	460	40	30	95	80	
12			1,020	155	360	680	320	40	50	95	95	
13			1,100	155	360	1,100	230	30	50	95	80	
14			1,060	155	360	1,340	200	23	23	95	80	
15			1,280	115	305	760	200	23	80	95	80	
16			880	205	305	760	175	19	65	80	80	
17			1,100	115	280	820	175	19	65	80	80	
18			880	115	280	760	150	23	80	80	80	
19			780	135	230	760	110	23	95	80	80	
20			730	135	230	650	95	23	95	80	80	
21			680	155	255	600	95	19	95	80	80	
22			540	135	580	500	80	19	95	80		
23			510	135	680	500	65	19	95	80		
24			480	180	880	500	65	15	95	80		
25			680	255	830	500	65	15	95	80		
26			510	280	780	500	80	13	95	80		
27			510	330	730	425	65	13	95	80		
28			480	305	630	385	65	13	80	80		
29			420	305	780	350	95	13	80	80		
30			360	280	730	350	80	13	80	80		
31			360		680		65	12		80		

Daily discharge, in second-feet, of Milk River at Havre, Mont., 1898–1917—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1902.												
1	.....	.....	412	161	188	465	630	710	310	335	310	.....
2	.....	.....	412	161	200	465	630	630	310	310	.....	.....
3	.....	.....	412	161	200	2,314	989	465	310	310	.....	.....
4	.....	.....	335	250	188	3,442	2,408	412	288	310	.....	.....
5	.....	.....	310	250	188	4,616	3,560	412	288	310	.....	.....
6	.....	.....	222	222	180	4,147	4,147	370	288	310	.....	.....
7	.....	.....	200	188	180	4,147	8,960	370	288	310	.....	.....
8	.....	.....	200	188	180	1,935	7,081	370	288	310	.....	.....
9	.....	.....	200	188	188	1,462	4,147	370	288	288	.....	.....
10	.....	.....	250	188	188	1,368	2,973	370	250	288	.....	.....
11	.....	.....	465	235	200	1,178	2,314	370	250	288	.....	.....
12	.....	.....	335	268	200	989	1,935	370	250	310	.....	.....
13	.....	.....	222	268	200	989	2,124	370	250	310	.....	.....
14	.....	.....	200	250	200	895	2,124	370	250	310	.....	.....
15	.....	.....	200	235	200	800	1,934	370	250	310	.....	.....
16	.....	.....	200	235	210	1,178	1,934	335	288	310	.....	.....
17	.....	.....	200	210	222	1,178	1,462	335	288	310	.....	.....
18	.....	.....	200	200	335	1,178	1,178	335	268	310	.....	.....
19	.....	210	200	188	335	1,178	989	335	250	310	.....	.....
20	.....	250	200	180	370	1,178	1,178	335	250	310	.....	.....
21	.....	210	200	170	370	1,178	1,178	335	250	310	.....	.....
22	.....	210	200	170	1,084	1,178	989	335	288	310	.....	.....
23	.....	188	200	180	3,912	1,084	1,178	310	310	310	.....	.....
24	.....	188	222	180	7,081	1,084	1,178	310	310	310	.....	.....
25	.....	188	235	180	7,668	989	1,178	335	335	310	.....	.....
26	.....	188	250	180	3,325	895	989	412	335	310	.....	.....
27	.....	222	250	170	2,503	800	895	370	310	310	.....	.....
28	.....	222	235	170	1,557	800	895	335	310	310	.....	.....
29	.....	.....	200	170	989	630	800	335	310	310	.....	.....
30	.....	.....	170	180	574	630	710	310	335	310	.....	.....
31	.....	.....	170	.....	574	.....	710	310	.....	310	.....	.....
1903.												
1	.....	.....	.....	1,620	860	2,820	451	339	339	118	128	.....
2	.....	.....	.....	1,220	795	2,520	451	395	285	118	118	.....
3	.....	.....	.....	1,025	535	2,520	451	620	235	110	118	.....
4	.....	.....	.....	1,520	535	2,220	451	620	235	110	118	.....
5	.....	.....	.....	1,520	507	1,920	451	677	235	110	118	.....
6	.....	.....	.....	1,220	395	1,420	451	620	195	118	118	.....
7	.....	.....	.....	1,620	339	1,320	734	563	168	145	118	.....
8	.....	.....	.....	1,620	339	1,120	677	507	145	145	118	.....
9	.....	.....	.....	1,520	395	1,025	620	451	128	145	110	.....
10	.....	.....	.....	1,220	395	860	620	395	128	145	110	.....
11	.....	.....	.....	935	339	795	620	395	128	145	118	.....
12	.....	.....	.....	734	285	734	734	339	128	145	118	.....
13	.....	.....	.....	935	563	563	734	285	128	145	.....	.....
14	.....	.....	.....	1,025	395	677	795	235	128	168	.....	.....
15	.....	.....	.....	795	285	620	734	195	168	168	.....	.....
16	.....	.....	.....	734	285	563	620	195	168	195	.....	.....
17	.....	.....	.....	734	339	563	451	339	168	168	.....	.....
18	.....	.....	.....	677	451	507	451	285	168	168	.....	.....
19	.....	.....	.....	677	935	507	339	195	168	168	.....	.....
20	.....	.....	.....	677	935	620	285	195	168	145	.....	.....
21	.....	.....	.....	620	935	563	235	168	168	128	.....	.....
22	.....	.....	.....	795	935	563	235	168	145	128	.....	.....
23	.....	.....	.....	795	1,025	507	195	168	145	128	.....	.....
24	.....	.....	.....	860	1,320	563	195	168	128	128	.....	.....
25	.....	.....	.....	860	1,520	507	168	168	128	128	.....	.....
26	.....	.....	.....	795	1,620	507	195	168	118	128	.....	.....
27	.....	.....	.....	795	1,820	563	285	145	128	128	.....	.....
28	.....	.....	.....	795	2,920	563	339	795	118	128	.....	.....
29	.....	.....	.....	734	3,920	507	339	734	118	128	.....	.....
30	.....	.....	.....	795	4,120	507	285	677	118	128	.....	.....
31	.....	.....	.....	.....	3,420	.....	195	507	.....	128	.....	.....

Daily discharge, in second-feet, of Milk River at Havre, Mont., 1898–1917—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1904.												
1				340	410	410	90	22	3	5	22	
2				375	410	490	90	12	5	10	26	
3				1,950	490	490	90	10	10	5	22	
4				3,140	490	450	90	5	10	5	22	
5				4,205	580	375	90	5	10	3	31	
6				3,140	580	340	75	3	5	3	31	
7				4,900	490	340	75	3	5	5	31	
8				3,400	450	375	75	4	5	41	31	
9				2,880	450	410	75	3	3	31	31	
10				2,275	450	410	51	3	3	22	31	
11				1,750	410	450	41	3	3	15	31	
12				3,140	410	340	41	2	2	15	31	
13				4,900	340	340	41	1	3	15	31	
14				3,140	295	310	41	1	3	10	31	
15				1,950	280	280	41	1	3	22	31	
16				1,655	310	280	41		3	22	31	
17				1,225	310	210	41		2	22	31	
18				1,005	310	220	41		2	22	51	
19				805	280	210	31		2	31	51	
20				630	255	210	31		2	31	41	
21				535	230	190	31	1	2	31	41	
22				490	230	190	26	5	1	31	41	
23				535	255	150	26	3	1	22	41	
24				630	340	135	22	5	1	22	41	
25				630	410	120	15	5	1	22	41	
26				490	325	135	15	10	1	22	41	
27				580	310	120	10	10	1	22	41	
28				535	325	120	10	5	1	22	41	
29				450	375	120	10	3	1	22	41	
30				410	375	105	10	3	3	22	41	
31					375		10	3		22		
1905.												
1			221	55	102	62	77	85				
2			221	63	85	62	48	85				
3			221	55	73	48	48	69				
4			210	55	73	48	48	69				
5			221	55	73	48	36	69				
6			221	55	69	48	62	102				
7			199	55	69	48	62	42				
8			266	50	69	25	62	42				
9			243	50	55	25	48	42				
10			199	50	55	25	48	20				
11			199	46	55	25	25	7				
12			85	50	69	25	16	7				
13			69	50	69	25	16	7				
14			69	50	55	25	25	2				
15			120	55	55	25	25	0				
16			139	50	48	16	16					
17			139	55	48	25	10					
18			130	55	36	25	6					
19			120	63	48	25	6					
20			178	55	48	25	6					
21			139	63	36	25	2					
22			139	63	36	16	2					
23			120	63	94	16	0					
24			120	63	77	16	0					
25			102	63	77	10	0					
26			102	63	62	25	2					
27			69	63	62	36	4					
28			85	73	62	62	340					
29			69	85	48	77	366					
30			55	102	48	94	158					
31			42		48		120					

Daily discharge, in second-feet, of Milk River at Havre, Mont., 1898–1917—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1906.												
1	.....	.....	.....	138	38	712	390	9	4	2	1	.....
2	.....	.....	.....	90	38	610	360	6	4	2	1	.....
3	.....	.....	.....	77	24	560	360	6	4	2	1	.....
4	.....	.....	.....	104	46	560	275	6	4	2	1	.....
5	.....	.....	.....	159	38	610	190	6	3	2	1	.....
6	.....	.....	.....	159	38	512	190	6	3	2	1	.....
7	.....	.....	.....	104	38	660	160	6	3	2	1	.....
8	.....	.....	.....	104	38	3,690	140	6	3	2	1	.....
9	.....	.....	.....	104	32	2,970	110	6	3	2	1	.....
10	.....	.....	.....	104	32	1,780	100	4		2	1	.....
11	.....	.....	.....	120	32	2,310	100	4	3	2	1	.....
12	.....	.....	.....	120	32	1,860	100	4	3	2	1	.....
13	.....	.....	.....	159	32	1,550	78	4	3	2	1	.....
14	.....	.....	.....	183	43	1,070	67	3	3	2	1	.....
15	.....	.....	.....	159	32	865	67	3	3	2	1	.....
16	.....	.....	.....	159	46	700	56	3	3	2	.....	.....
17	.....	.....	.....	138	55	600	56	3	3	1	.....	.....
18	.....	.....	.....	97	46	550	56	3	3	1	.....	.....
19	.....	.....	.....	77	38	600	56	3	3	1	.....	.....
20	.....	.....	.....	65	38	420	37	3	3	1	.....	.....
21	.....	.....	.....	65	97	420	37	3	3	1	.....	.....
22	.....	.....	.....	60	46	460	28	9	2	1	.....	.....
23	.....	.....	.....	46	38	550	20	14	2	1	.....	.....
24	.....	.....	.....	38	46	460	20	9	2	1	.....	.....
25	.....	.....	.....	38	104	420	20	6	2	1	.....	.....
26	.....	.....	.....	32	120	550	14	6	2	1	.....	.....
27	.....	.....	104	38	138	460	14	4	2	1	.....	.....
28	.....	.....	104	32	183	500	14	4	2	1	.....	.....
29	.....	.....	120	32	239	550	9	4	2	1	.....	.....
30	.....	.....	138	38	686	480	9	4	2	1	.....	.....
31	.....	.....	183	.....	1,230	.....	9	4	.....	1	.....	.....
1907.												
1	.....	.....	.....	910	300	430	1,000	110	50	145	62	.....
2	.....	.....	.....	1,100	300	390	760	110	50	135	62	.....
3	.....	.....	.....	2,040	310	390	648	90	50	130	68	.....
4	.....	.....	.....	2,650	280	368	638	105	60	100	68	.....
5	.....	.....	.....	3,500	255	390	580	90	66	105	68	.....
6	.....	.....	.....	2,850	255	390	565	72	40	80	68	.....
7	.....	.....	.....	2,400	280	390	520	90	81	90	68	.....
8	.....	.....	.....	2,120	315	430	505	90	81	80	75	.....
9	.....	.....	.....	2,520	350	512	505	60	81	100	75	.....
10	.....	.....	.....	2,140	430	467	490	72	90	80	50	.....
11	.....	.....	.....	2,160	280	430	490	60	90	90	55	.....
12	.....	.....	.....	1,300	280	390	440	50	90	80	55	.....
13	.....	.....	.....	1,560	760	390	440	60	110	90	55	.....
14	.....	.....	.....	1,490	560	390	430	60	135	80	62	.....
15	.....	.....	.....	1,040	510	512	387	50	168	75	62	.....
16	.....	.....	.....	810	580	520	480	50	192	80	55	.....
17	.....	.....	.....	760	590	400	370	50	168	75	55	.....
18	.....	.....	.....	650	510	400	290	40	155	68	55	.....
19	.....	.....	.....	550	520	400	287	50	145	68	68	.....
20	.....	.....	.....	490	440	360	250	40	130	68	80	.....
21	.....	.....	1,540	400	710	325	250	50	110	68	100	.....
22	.....	.....	2,300	330	740	325	225	50	135	68	90	.....
23	.....	.....	1,660	330	640	3,720	310	50	145	68	90	.....
24	.....	.....	3,750	360	620	1,510	250	45	288	68	90	.....
25	.....	.....	2,750	330	615	1,760	225	45	230	68	90	.....
26	.....	.....	1,290	300	560	3,160	200	45	218	68	90	.....
27	.....	.....	1,160	310	500	1,580	172	40	180	62	90	.....
28	.....	.....	800	275	460	1,400	172	40	168	62	90	.....
29	.....	.....	1,100	290	390	1,270	150	40	168	62	90	.....
30	.....	.....	940	390	445	1,250	150	50	145	62	90	.....
31	.....	.....	910	.....	420	.....	130	55	.....	62	.....	.....

Daily discharge, in second-feet, of Milk River at Havre, Mont., 1898–1917—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	.....	.....	200	218	290	1,000	810	230	150	155	285	.....
2	.....	.....	200	208	290	660	810	230	150	165	270	.....
3	.....	.....	200	208	250	660	810	205	150	190	270	.....
4	.....	.....	200	254	242	2,150	750	205	140	215	272	.....
5	.....	.....	200	375	230	2,580	740	205	130	242	350	.....
6	.....	.....	208	450	230	2,150	700	205	130	260	330	.....
7	.....	.....	208	375	205	4,720	685	205	125	240	315	.....
8	.....	.....	208	335	205	6,500	630	188	125	240	285	.....
9	.....	.....	208	485	205	9,600	630	188	120	200	255	.....
10	.....	.....	208	408	205	7,600	630	188	118	200	200	.....
11	.....	.....	208	335	205	3,700	610	155	115	200	150	.....
12	.....	.....	208	320	205	2,500	600	155	115	200	150	.....
13	.....	.....	208	285	215	2,020	565	188	115	210	140	.....
14	.....	.....	208	255	230	1,850	515	188	112	240	140	.....
15	.....	.....	208	230	230	1,660	470	188	110	225	140	.....
16	.....	.....	208	235	250	1,540	410	188	110	155	140	.....
17	.....	.....	228	265	395	1,540	410	192	110	145	135	.....
18	.....	.....	228	265	395	1,430	410	155	110	135	135	.....
19	.....	.....	218	235	660	1,260	410	155	125	135	135	.....
20	.....	.....	197	220	585	1,160	585	188	125	135	135	.....
21	.....	.....	228	280	515	1,110	510	188	125	125	135	.....
22	.....	.....	208	280	490	1,050	465	165	110	120	135	.....
23	.....	.....	280	280	395	1,050	465	165	90	110	135	.....
24	.....	.....	190	250	380	1,020	430	165	95	90	135	.....
25	.....	.....	170	250	350	1,000	430	165	108	90	135	.....
26	.....	.....	228	250	350	840	360	140	135	90	135	.....
27	.....	.....	228	390	320	840	350	140	135	135	135	.....
28	.....	.....	228	320	320	820	290	140	135	200	135	.....
29	.....	.....	228	290	310	820	280	140	145	200	135	.....
30	.....	.....	218	290	325	820	290	140	145	200	135	.....
31	.....	.....	218	.....	760	.....	290	140	.....	285	.....	.....
1909.												
1	.....	.....	450	430	840	1,160	450	835	38	62	95	.....
2	.....	.....	430	515	685	840	405	650	38	68	95	.....
3	.....	.....	390	470	465	825	405	480	32	65	95	.....
4	.....	.....	355	430	375	745	390	360	27	65	95	.....
5	.....	.....	390	370	305	690	565	290	29	65	95	.....
6	.....	.....	390	610	2,810	690	520	245	29	65	95	.....
7	.....	.....	355	470	2,810	690	495	230	28	65	95	.....
8	.....	.....	370	395	1,980	690	515	190	27	65	95	.....
9	.....	.....	355	355	1,350	635	540	190	25	65	95	.....
10	.....	.....	355	370	1,030	620	450	205	25	62	95	.....
11	.....	.....	315	370	900	620	470	180	70	62	95	.....
12	.....	.....	315	300	590	1,160	470	155	85	62	95	.....
13	.....	.....	315	265	840	1,130	590	145	80	62	95	.....
14	.....	.....	315	265	1,020	830	430	145	78	62	.....	.....
15	.....	.....	315	405	830	670	320	120	75	62	.....	.....
16	.....	.....	285	405	750	620	320	105	55	62	.....	.....
17	.....	.....	285	315	750	570	285	97	55	70	.....	.....
18	.....	.....	285	265	1,860	535	450	95	55	75	.....	.....
19	.....	.....	300	265	1,640	685	285	92	55	70	.....	.....
20	.....	.....	300	300	1,160	930	230	92	55	70	.....	.....
21	.....	.....	315	285	1,070	870	200	90	55	70	.....	.....
22	.....	.....	315	245	1,160	810	200	85	52	84	.....	.....
23	.....	.....	430	305	2,590	705	175	80	68	90	.....	.....
24	.....	.....	430	340	3,780	655	225	70	68	90	.....	.....
25	.....	.....	430	395	4,160	870	170	65	68	90	.....	.....
26	.....	.....	390	360	3,770	650	150	60	62	90	.....	.....
27	.....	.....	335	360	2,790	525	180	52	62	90	.....	.....
28	.....	.....	315	490	2,290	500	310	48	62	90	.....	.....
29	.....	.....	355	1,400	2,120	480	365	40	62	95	.....	.....
30	.....	.....	430	1,140	1,800	865	545	38	62	95	.....	.....
31	.....	.....	370	.....	1,540	.....	260	38	.....	95	.....	.....

Daily discharge, in second-feet, of Milk River at Havre, Mont., 1898–1917—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1910.												
1	.....	.....	.....	283	161	161	38	.....	.....	11	27	.....
2	.....	.....	1,400	283	161	138	27	.....	.....	11	27	.....
3	.....	.....	1,600	249	161	138	27	.....	.....	11	27	.....
4	.....	.....	1,800	249	161	138	27	.....	.....	11	27	.....
5	.....	.....	1,860	217	161	138	27	.....	.....	11	27	.....
6	.....	.....	1,720	217	161	138	27	.....	.....	11	27	.....
7	.....	.....	1,530	188	161	138	38	.....	.....	7	27	.....
8	.....	.....	1,280	188	138	117	38	.....	.....	11	27	.....
9	.....	.....	1,220	188	138	117	27	.....	.....	11	27	.....
10	.....	.....	920	188	138	117	27	.....	.....	11	27	.....
11	.....	.....	1,100	138	161	117	27	.....	.....	18	51	.....
12	.....	.....	1,220	138	161	117	27	.....	.....	18	51	.....
13	.....	.....	980	117	138	98	27	.....	.....	18	38	.....
14	.....	.....	920	117	138	98	27	.....	0	27	38	.....
15	.....	.....	1,220	161	138	98	18	.....	7	27	38	.....
16	.....	.....	1,040	161	138	81	11	.....	7	27	38	.....
17	.....	.....	1,530	161	138	161	7	.....	11	27	38	.....
18	.....	.....	1,340	217	161	161	6	.....	18	27	38	.....
19	.....	.....	1,040	217	188	117	6	.....	18	27	38	.....
20	.....	.....	860	188	188	98	4	.....	18	27	38	.....
21	.....	.....	920	188	188	81	2	.....	18	27	38	.....
22	.....	.....	800	188	188	81	2	.....	18	27	38	.....
23	.....	.....	740	161	188	81	2	.....	18	27	38	.....
24	.....	.....	630	161	161	81	2	.....	18	27	38	.....
25	.....	.....	1,160	319	217	65	2	.....	27	27	38	.....
26	.....	.....	575	319	217	51	1	.....	18	27	36	.....
27	.....	.....	525	188	217	38	1	.....	27	27	34	.....
28	.....	.....	575	188	188	38	0	.....	18	27	32	.....
29	.....	.....	575	161	188	38	.....	.....	18	27	30	.....
30	.....	.....	480	161	161	38	.....	.....	11	27	28	.....
31	.....	.....	396	.....	161	.....	.....	.....	.....	27	.....	.....
1911.												
1	.....	.....	10	410	575	315	710	70	35	210	180	.....
2	.....	.....	30	410	460	315	1,420	70	35	275	171	.....
3	.....	.....	50	360	410	360	1,340	85	35	315	163	.....
4	.....	.....	70	360	210	360	780	85	35	315	155	.....
5	.....	.....	90	315	155	315	575	70	1,720	460	180	.....
6	.....	.....	110	180	240	275	575	105	2,410	640	155	.....
7	.....	.....	130	155	155	210	575	105	2,980	575	180	.....
8	.....	.....	150	410	155	240	410	130	1,940	275	.....	.....
9	.....	.....	180	315	155	315	360	155	1,570	275	.....	.....
10	.....	.....	105	275	240	360	315	155	1,270	240	.....	.....
11	.....	.....	70	210	210	210	240	155	640	315	.....	.....
12	.....	.....	70	240	275	210	210	210	460	275	.....	.....
13	.....	.....	70	240	210	180	210	360	360	315	.....	.....
14	.....	.....	90	410	180	155	180	240	710	275	.....	.....
15	.....	.....	110	575	210	155	155	210	640	275	.....	.....
16	.....	.....	130	460	240	210	155	240	515	240	.....	.....
17	.....	.....	150	315	275	180	155	155	460	275	.....	.....
18	.....	.....	180	275	315	180	130	130	360	240	.....	.....
19	.....	.....	275	275	1,570	155	130	130	360	275	.....	.....
20	.....	.....	360	240	1,340	155	105	105	315	210	.....	.....
21	.....	.....	410	210	780	180	130	70	275	240	.....	.....
22	.....	.....	640	210	640	180	105	70	315	240	.....	.....
23	.....	.....	410	210	575	210	105	70	360	275	.....	.....
24	.....	.....	1,060	180	410	180	105	55	360	240	.....	.....
25	.....	.....	1,060	210	460	210	85	55	360	275	.....	.....
26	.....	.....	920	275	410	360	85	55	315	240	.....	.....
27	.....	.....	850	515	460	850	85	55	360	210	.....	.....
28	.....	.....	710	640	410	2,330	85	45	240	180	.....	.....
29	.....	.....	640	460	360	1,420	70	45	275	210	.....	.....
30	.....	.....	575	515	460	1,060	70	35	210	155	.....	.....
31	.....	.....	515	.....	360	.....	55	35	.....	180	.....	.....

Daily discharge, in second-feet, of Milk River at Havre, Mont., 1898–1917—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1912.												
1	.....	.....	.....	3,960	545	500	110	102	40	102	102	.....
2	.....	.....	.....	4,170	590	460	120	102	40	102	102	.....
3	.....	.....	.....	4,280	640	420	110	102	40	102	102	.....
4	.....	.....	.....	3,540	590	380	120	102	40	102	102	.....
5	.....	.....	.....	2,830	380	380	100	102	40	102	102	.....
6	.....	.....	.....	2,100	500	380	110	85	34	85	102	.....
7	.....	.....	.....	2,020	500	380	100	85	34	85	102	.....
8	.....	.....	.....	1,690	460	340	110	85	34	85	102	.....
9	.....	.....	.....	1,310	460	300	150	85	34	85	85	.....
10	.....	.....	.....	980	420	300	150	85	58	85	85	.....
11	.....	.....	.....	1,170	420	230	150	85	58	85	122	.....
12	.....	.....	.....	1,170	420	265	120	58	48	122	102	.....
13	.....	.....	.....	1,310	420	200	120	58	58	122	102	.....
14	.....	.....	.....	1,240	340	200	120	48	58	122	102	.....
15	.....	.....	.....	1,100	380	170	120	48	58	122	102	.....
16	.....	.....	.....	1,040	420	200	120	48	58	122	102	.....
17	.....	.....	.....	860	420	240	119	70	58	102	102	.....
18	.....	.....	.....	860	300	240	118	85	58	102	85	.....
19	.....	.....	.....	690	340	200	116	85	58	122	122	.....
20	.....	.....	.....	690	340	200	112	170	58	122	102	.....
21	.....	.....	.....	745	300	150	110	145	58	122	102	.....
22	.....	.....	.....	745	265	170	110	85	58	102	102	.....
23	.....	.....	.....	590	300	130	102	70	58	102	102	.....
24	.....	.....	745	640	340	140	102	58	122	102	102	.....
25	.....	.....	1,530	590	340	120	102	58	145	102	102	.....
26	.....	.....	3,850	640	590	140	102	48	145	102	102	.....
27	.....	.....	4,610	545	920	110	85	48	145	102	102	.....
28	.....	.....	5,710	545	745	120	85	48	170	102	58	.....
29	.....	.....	7,790	545	640	110	145	48	170	102	48	.....
30	.....	.....	4,170	500	590	120	122	48	170	102	48	.....
31	.....	.....	2,830	.....	545	.....	102	40	.....	102	.....	.....
1913.												
1	.....	.....	.....	945	565	505	395	38	38	20	58	58
2	.....	.....	.....	1,370	750	565	565	31	38	20	58	58
3	.....	.....	.....	880	625	565	505	38	31	31	58	70
4	.....	.....	.....	1,010	625	625	565	38	25	31	58	70
5	.....	.....	.....	1,220	450	505	505	38	20	31	70	70
6	.....	.....	.....	1,450	505	395	505	58	20	31	70	70
7	.....	.....	.....	1,450	395	345	195	70	20	58	70	70
8	.....	.....	.....	2,160	450	345	225	58	15	58	70	70
9	.....	.....	.....	1,880	395	300	170	43	15	58	70	70
10	.....	.....	.....	1,700	450	300	195	40	15	58	70	.....
11	.....	.....	.....	1,220	395	300	170	56	15	58	70	.....
12	.....	.....	.....	1,370	450	260	145	42	12	58	70	.....
13	.....	.....	.....	1,450	395	300	145	42	12	47	58	.....
14	.....	.....	.....	2,060	1,080	260	123	43	12	47	58	.....
15	.....	.....	.....	2,540	750	345	145	66	12	47	58	.....
16	.....	.....	.....	2,260	815	260	104	45	12	58	58	.....
17	.....	.....	.....	2,160	685	260	123	46	9	58	58	.....
18	.....	.....	.....	1,880	685	505	70	123	7	47	58	.....
19	.....	.....	.....	1,450	625	260	86	125	7	58	58	.....
20	.....	.....	.....	1,300	685	195	70	698	7	58	58	.....
21	.....	.....	.....	1,080	625	260	86	314	7	58	58	.....
22	.....	.....	.....	880	750	345	70	207	9	123	70	.....
23	.....	.....	.....	1,300	685	300	86	150	7	123	70	.....
24	.....	.....	.....	1,150	815	195	58	119	7	123	70	.....
25	.....	.....	.....	880	750	225	58	121	7	86	70	.....
26	.....	.....	.....	815	625	260	58	86	25	86	70	.....
27	.....	.....	.....	815	565	225	38	70	25	86	70	.....
28	.....	.....	.....	815	625	300	47	47	20	70	58	.....
29	.....	.....	.....	815	505	685	31	47	20	70	58	.....
30	.....	.....	.....	625	565	625	31	47	25	58	58	.....
31	.....	.....	1,370	.....	535	.....	31	38	.....	58	.....	.....

Daily discharge, in second-feet, of Milk River at Havre, Mont., 1898–1917—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1914.												
1				945	159	83	97		1.0	5		
2				620	159	83	70		1.0	5		
3				555	182	97	57		1.0	5		
4				375	159	57	57		1.0	5		
5				325	182	57	57		1.0	7		
6				620	182	126	57		1.0	10		
7				375	159	281	45		1.0	57		
8			750	431	210	243	45		1.0	143		
9			685	375	210	141	45		1.0	188		
10			555	685	159	141	34		1.0	258		
11			375	620	210	126	34		1.0	303		
12			492	431	210	97	24		1.5	307		
13			945	555	243	111	16		1.5	138		
14			1,080	375	182	111	16		10	110		
15			1,010	431	182	111	16		10	97		
16			685	431	182	159	10		83	98		
17			685	620	159	126	57		83	130		
18			555	685	141	141	24		70	132		
19			375	431	126	83	24		70	134		
20			159	431	126	83	10		70	135		
21			126	431	111	83	10		16	138		
22			126	325	111	70	3.5		7	549		
23			555	375	126	83	3.5	0.2	7	325		
24			375	281	126	70	1.5	1.5	7	215		
25			318	281	126	57	1.0	2.5	7	215		
26			261	281	97	97	1.5	7.0	7	215		
27			203	281	97	126	1.5	7.0	7	215		
28			145	210	111	243	1.5	7.0	7	215		
29			97	159	97	159		7.0	7	148		
30			97	159	83	111		7.0	5	148		
31			159		83			7.0		132		
1915.												
1				635	91	182	646	360	118	145	129	
2				580	91	210	340	307	105	145	129	
3				580	91	243	440	199	107	145	129	
4				525	118	486	285	307	108	145	129	
5				580	91	480	243	254	110	145	129	
6				580	91	594	240	243	111	145	129	
7				580	78	841	316	204	112	164	129	
8				635	78	828	414	202	114	164	129	
9				580	66	815	312	199	116	164	129	
10				372	189	932	233	170	117	164	129	
11				420	167	737	233	148	196	188	129	
12				285	132	581	355	116	199	217	122	
13				247	132	505	355	114	175	217	115	
14				215	148	325	403	97	138	188	108	
15				189	167	607	403	80	138	251	101	
16				247	213	474	350	120	141	217	94	
17				167	281	409	397	117	375	217	87	
18				148	240	409	258	220	243	188	80	
19				148	236	409	340	114	243	188	73	
20				132	199	588	220	98	243	188	66	
21				148	455	517	164	97	217	164	60	
22				132	392	574	145	277	251	164	54	
23			3,330	132	386	335	285	273	251	164	50	
24			3,640	118	381	285	285	236	217	145	50	
25			3,130	118	210	281	243	204	188	145	50	
26			1,450	148	210	207	243	180	164	129	50	
27			745	118	210	204	157	141	164	129	50	
28			1,700	118	159	312	157	124	164	129	50	
29			865	104	182	307	138	114	164	129	50	
30			580	91	182	226	273	116	145	129	50	
31			690		182		312	117		129		

Daily discharge, in second-feet of Milk River at Havre, Mont., 1898–1917—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1916.												
1				381	316	1,310	1,240	419	213	154	256	
2				381	349	1,380	1,380	341	241	165	227	
3				381	275	1,020	2,220	461	188	200	213	
4				381	341	784	4,850	419	165	200	213	
5				381	272	1,090	2,130	341	241	200	200	
6				505	241	896	1,620	341	379	323	200	
7				421	241	784	1,460	341	593	323	188	
8				421	272	838	1,380	305	896	360	176	
9				343	241	593	1,460	1,780	639	379	188	
10				343	272	784	2,510	734	548	360	144	
11				421	272	784	1,460	504	461	341		
12				343	272	1,160	1,160	461	419	360		
13				381	305	896	1,090	419	341	341		
14				463	305	784	896	379	272	341		
15				421	272	1,020	896	548	288	305		
16				421	241	896	734	461	305	288		
17			1,060	463	241	686	639	461	256	288		
18				381	272	639	1,240	379	227	288		
19				381	213	593	784	379	241	272		
20				343	213	1,240	548	341	227	305		
21				550	213	548	593	305	176	272		
22				421	241	734	548	272	176	272		
23				273	213	1,020	504	272	200	241		
24				379	241	838	548	272	194	241		
25				269	341	838	504	341	188	227		
26				266	1,020	784	419	305	188	256		
27			550	295	1,090	958	1,090	305	200	256		
28			421	260	1,090	896	593	241	200	256		
29			421	256	1,020	784	461	241	165	256		
30			463	285	1,540	1,090	461	213	165	256		
31			381		1,780		440	241		256		
1917.												
1				2,450	958	978	370	326	300	80	190	96
2				2,630	896	1,360	370	296	300	78	190	34
3				2,450	838	1,220	370	311	300	74	190	34
4				2,150	896	1,080	370	311	317	86	190	34
5				2,080	958	902	370	311	317	67	190	35
6				1,980	989	890	370	326	317	66	190	36
7				1,920	1,020	867	370	326	317	58	190	36
8				2,750	896	769	370	326	334	54	190	37
9				5,000	838	724	370	342	408	54	190	38
10				6,500	1,240	736	370	358	370	54	190	39
11				7,940	1,310	749	370	358	300	52	190	42
12				5,730	1,160	759	370	393	370	52	190	44
13				4,220	1,310	855	393	393	370	50	156	46
14				4,110	1,380	1,080	375	393	408	48	142	48
15				3,200	1,460	1,500	375	411	408	47	144	50
16				2,700	1,400	1,180	393	411	389	48	138	51
17				2,220	1,470	986	393	393	328	87	133	53
18				2,130	1,480	791	393	375	268	87	144	55
19				1,680	1,330	706	393	355	222	87	154	56
20				1,240	1,260	681	375	352	208	87	140	186
21				1,160	1,200	618	375	336	158	87	127	142
22				1,460	1,130	596	375	330	125	87	117	99
23				1,240	1,050	573	358	299	108	87	107	86
24				1,380	1,020	530	342	291	300	87	97	74
25				1,380	1,350	489	326	288	532	87	88	62
26				1,310	1,130	469	296	271	352	87	88	50
27				1,160	1,180	449	296	280	252	87	96	40
28			1,630	958	1,110	430	326	282	252	87	104	40
29			2,330	1,020	1,180	411	326	284	203	87	98	40
30			3,300	1,020	1,240	375	296	284	151	87	93	40
31			2,500		1,100		311	284		87		40

NOTE.—1898: Discharge estimated as follows: Nov. 20–30, 100 second-feet; Dec. 1–4, 113 second-feet.
1899: Records originally published for January omitted from compilation because based on insufficient data. Only scattering gage heights reported June 1 to Aug. 31 and Nov. 6–30.
1900: Nov. 16 to Dec. 16 and Dec. 23–31, river frozen; gage heights not reported.
1901: Mar. 11–31, stage-discharge relation assumed unaffected by ice; as originally published the mean for this period was estimated at 600 second-feet; mean flow Mar. 1–10 was probably twice as great as from Mar. 11–31, but stage-discharge relation was affected by ice gorge and accurate estimates can not be made. Nov. 7 and Nov. 22–30, stage-discharge relation affected by ice; mean discharge estimated at 80 second-feet.

1902: Records originally published for January, November, and December omitted from compilation because based on insufficient data. Open-channel rating curve assumed applicable Feb. 19 to Nov. 1, 1902.
1903: Records Jan. 1 to Mar. 31 and Nov. 13 to Dec. 31 omitted from compilation; base data inadequate. Discharge Apr. 1–4, 1903, estimated.
1904: Records Jan. 1 to Mar. 31 and Dec. 1–31 omitted from compilation; base data inadequate.
1905: Records for January and February omitted from compilation; base data inadequate. Daily discharge Mar. 1–31 determined by applying open-channel rating curve to gage heights; results obtained in this way are consistent with those obtained at Malta. Channel dry Aug. 15 to Dec. 31.
1906: Practically no flow Nov. 16 to Dec. 31.
1907: Records for February and December omitted from compilation; base data inadequate. Stage-discharge relation affected by ice Mar. 1–20; discharge estimated at 400 second-feet.
1908: Stage-discharge relation affected by ice Mar. 1–15, Nov. 13–16, and Nov. 25–30; discharge estimated. Gage heights not reported Mar. 27 to Apr. 2; discharge estimated.
1910: Records for January, February, and December omitted from compilation; base data inadequate. Mar. 1, discharge estimated. Channel dry July 28 to Sept. 14.
1911: Records for December omitted from compilation; base data inadequate. Mar. 1–8 and 14–17, discharge estimated. Nov. 8–30, mean discharge estimated at 75 second-feet.
1913: Accuracy of gage-height observations for September and of the determinations of discharge based thereon are questionable.
1914: Channel dry July 29 to Aug. 22.
1915: Shifting-control method used to determine daily discharge from May to November 11. Discharge measurements were made frequently, but the results are 10 to 20 per cent lower than they should be to make them consistent with those obtained at stations above. Gage not read; discharge interpolated Nov. 12–21. Discharge Nov. 23–30 estimated at 50 second-feet.
1916: Chinook winds and ice jams in February and March caused the river to rise rapidly, a stage of 15.9 feet being reached Feb. 21–22 and 17.2 feet Mar. 12. Flow not computed Nov. 11 to Dec. 31. Gage read about three times a week. Shifting-control method used to determine daily discharge Apr. 24 to May 3 and May 26 to July 3.
1917: Jan. 1 to Mar. 27, gage read about three times a week; flow not computed. Gage not read July 1–12, discharge estimated at 370 second-feet by comparison with record of flow of Milk River at eastern crossing.

Monthly discharge of Milk River at Havre, Mont., 1898–1917.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1898.				
May 15–31	2,432	836	1,396	47,051
June	2,546	200	1,354	80,568
July	950	0	162	9,960
August	893	33	113	6,948
September	104	11	53	3,154
October	125	11	88	5,411
November 1–19	110	93	100	3,770
The period	.....	.....	.....	157,000
1899.				
April 16–30	2,880	620	1,365	40,612
May	1,680	570	1,054	64,808
June	.....	.....	843	50,162
July	.....	.....	240	14,757
August	.....	.....	188	11,560
September	235	84	131	7,795
October	110	80	94	5,780
November	.....	.....	205	12,198
The period	.....	.....	.....	207,672
1900.				
April 10 to 30	640	280	394	16,411
May	1,575	129	435	26,747
June	355	76	154	9,164
July	91	21	43	2,644
August	232	8	40	2,460
September	169	21	76	4,522
October	355	76	186	11,437
November 1 to 15	169	63	114	3,392
The period	.....	.....	.....	76,777
1901.				
March 11–30	.....	.....	728	30,323
April	330	115	205	12,198
May	2,272	230	648	39,844
June	1,340	330	553	32,906
July	460	65	184	11,314
August	65	12	28	1,722
September	95	11	56	3,332
October	95	65	82	5,042
November	95	65	80	4,760
The period	.....	.....	.....	141,441

Monthly discharge of Milk River at Havre, Mont., 1898–1917—Continued.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1902.				
February 19–28	.....	.....	208	4,126
March	465	170	249	15,310
April	268	161	199	11,841
May	7,668	180	1,085	66,714
June	4,616	465	1,479	88,007
July	8,960	630	2,045	125,742
August	710	310	377	23,181
September	335	250	286	17,018
October	335	288	309	18,999
The period	.....	.....	.....	371,415
1903.				
April	1,620	620	996	59,266
May	4,120	285	1,079	66,344
June	2,820	507	975	58,015
July	795	168	445	27,362
August	795	145	378	23,242
September	339	118	164	9,759
October	195	110	138	8,485
November 1–12	.....	.....	118	2,808
The period	.....	.....	.....	255,281
1904.				
April	4,900	340	1,736	103,299
May	580	230	373	22,935
June	490	105	278	16,542
July	90	10	44	2,705
August	22	0	5	307
September	10	1	3	178
October	41	3	19	1,168
November	51	22	35	2,083
The period	.....	.....	.....	149,217
1905.				
March	.....	.....	146	8,977
April	102	46	59	3,511
May	102	36	61	3,751
June	94	10	35	2,083
July	366	0	54	3,320
August	102	0	25	1,290
The period	.....	.....	.....	22,900
1906.				
March 27–31	183	104	130	1,290
April	183	32	94.6	5,630
May	1,230	24	119	7,320
June	3,690	420	935	55,600
July	390	9	101	6,210
August	14	3	5.2	320
September	4	2	2.8	167
October	2	1	1.5	92
November 1–15	1	1	1.0	30
The period	.....	.....	.....	76,700
1907.				
March	3,750	.....	845	52,000
April	3,500	275	1,210	72,000
May	760	255	458	28,200
June	3,720	325	822	48,900
July	1,000	130	397	24,400
August	110	40	61.6	3,790
September	288	40	127	7,560
October	145	62	81.8	5,030
November	100	50	72.5	4,310
The period	.....	.....	.....	246,000
1908.				
March	280	170	212	13,000
April	485	208	295	17,600
May	760	205	330	20,300
June	9,600	660	2,190	130,000
July	810	280	527	32,400
August	230	140	177	10,900
September	150	90	124	7,389
October	285	90	178	10,900
November	350	135	186	11,100
The period	.....	.....	.....	254,000

Monthly discharge of Milk River at Havre, Mont., 1898–1917—Continued.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1909.				
March	450	285	354	21,800
April	1,400	245	430	25,600
May	4,160	305	1,610	99,000
June	1,160	480	742	44,200
July	590	150	367	22,600
August	835	38	180	11,100
September	85	25	52.7	3,140
October	95	62	73.6	4,530
November 1–13	.....	.....	95.0	2,450
The period	.....	.....	.....	234,000
1910.				
March	1,860	396	1,060	65,200
April	319	117	197	11,700
May	217	138	167	10,300
June	161	38	103	6,130
July	38	0	15.3	940
August	0	0	0	0
September	27	0	9.0	536
October	27	7	20.8	1,280
November	51	27	34.2	2,040
The period	.....	.....	.....	103,000
1911.				
March	1,060	.....	330	20,300
April	640	155	329	19,600
May	1,570	155	416	25,600
June	2,330	155	394	23,400
July	1,420	55	313	19,200
August	360	35	115	7,070
September	2,980	35	664	39,500
October	640	155	281	17,300
November	180	.....	97	5,770
The period	.....	.....	.....	178,000
1912.				
March 24–31	7,790	745	3,900	61,900
April	4,280	500	1,440	85,700
May	920	265	466	28,700
June	500	110	243	14,500
July	150	85	115	7,070
August	170	40	77.0	4,740
September	170	34	73.5	4,370
October	122	85	104	6,400
November	122	48	96.6	5,750
The period	.....	.....	.....	219,000
1913.				
April	2,540	625	1,360	80,900
May	1,080	395	607	37,300
June	685	195	360	21,400
July	565	31	181	11,100
August	698	31	96.3	5,920
September	38	7	16.5	982
October	123	20	60.4	3,710
November	70	58	63.6	3,780
December 1–9	70	58	67.3	1,200
The period	.....	.....	.....	166,000
1914.				
March 8–31	1,080	97	451	21,500
April	945	159	437	26,000
May	243	83	151	9,280
June	281	57	119	7,080
July	97	0	26.4	1,620
August	7	0	1.49	91.6
September	83	1	16.2	964
October	549	5	154	9,470
The period	.....	.....	.....	76,000

Monthly discharge of Milk River at Havre, Mont., 1898–1917—Continued.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1915.				
March 23-31	3,640	580	1,790	32,000
April	635	91	302	18,000
May	455	66	189	11,600
June	932	182	463	27,600
July	646	138	296	18,200
August	360	80	179	11,000
September	375	105	171	10,200
October	251	129	166	10,200
November	129	.....	92.6	5,510
The period	.....	.....	.....	144,000
1916.				
April	550	256	374	22,300
May	1,780	213	459	28,200
June	1,380	548	889	52,900
July	4,850	419	1,160	71,300
August	1,780	213	414	25,500
September	896	165	300	17,900
October	379	154	277	17,000
November 1-10	256	144	200	3,970
The period	.....	.....	.....	239,000
1917.				
March 28-31	3,300	1,630	2,440	19,400
April	7,940	958	2,570	153,000
May	1,480	838	1,150	70,700
June	1,500	375	792	47,100
July	393	296	360	22,100
August	411	271	332	20,400
September	532	108	300	17,900
October	87	47	73.3	4,510
November	190	88	148	8,810
December	186	34	56.9	3,500
The period	.....	.....	.....	367,000

NOTE.—1898: Mean discharge for December, originally published, has been discarded because it was obtained by applying open-channel rating curve. The minimum temperature in this locality in November was −14°, and in December it was −15°. This temperature would cause considerable ice to form in the river at the gage.

1899: Monthly means for May, June, July, August, and November, recomputed by interpolating between gage readings. Published records did not give weight to the time between readings. See footnote to daily discharge for published monthly means omitted based because on insufficient data.

1901: Mean monthly discharge for November estimated from daily discharge Nov. 1-21.

Mean monthly discharge, in second-feet, of Milk River at Havre, Mont., 1898–1917.

Year.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total in acre-feet.
1898	.....	.....	.....	[a]1,400	1,350	162	113	53	88	[b]100	.....	157,000
1899	.....	.....	[c]1,360	1,050	843	240	188	131	94	205	.....	208,000
1900	.....	.....	[d]394	435	154	43	40	76	186	[e]114	.....	76,800
1901	.....	[f]728	205	648	553	184	28	56	82	80	.....	141,000
1902	[g]208	249	199	1,080	1,480	2,040	377	286	309	.....	.....	371,000
1903	.....	.....	996	1,080	975	445	378	164	138	[h]118	.....	255,000
1904	.....	.....	1,740	373	278	44	5	3	19	35	.....	149,000
1905	.....	146	59	61	35	54	25	0	0	0	.....	22,900
1906	.....	[j]130	94.6	119	935	101	5.2	2.8	1.5	[k]1.0	.....	76,700
1907	.....	845	1,210	458	822	397	61.6	127	81.8	72.5	.....	246,000
1908	.....	212	295	330	2,190	527	177	124	178	186	.....	254,000
1909	.....	354	430	1,610	742	367	180	52.7	73.6	[m]95.0	.....	234,000
1910	.....	1,060	197	167	103	15.3	0	9.0	20.8	34.2	.....	103,000
1911	.....	330	329	416	394	313	115	664	281	97	.....	178,000
1912	.....	[n]3,900	1,440	466	243	115	77.0	73.5	104	96.6	.....	219,000
1913	.....	.....	1,360	607	360	181	96.3	16.5	60.4	63.6	[o]67.3	166,000
1914	.....	[p]451	437	151	119	26.4	1.49	16.2	154	.....	.....	76,000
1915	.....	[q]1,790	302	189	463	296	179	171	166	92.6	.....	144,000
1916	.....	.....	374	459	889	1,160	414	300	277	[r]200	.....	259,000
1917	.....	[s]2,440	2,570	1,150	792	[t]254	[t]143	[t]183	73.3	148	56.9	[t]342,000
Average	.....	486	702	612	686	348	130	125	119	93.1	.....	183,000
Median	.....	354	412	458	648	247	105	74.8	91	92.6	.....	172,000
Maximum	.....	1,060	2,570	1,610	2,190	2,040	414	664	309	205	.....	371,000
Minimum	.....	146	59	61	35	15.3	0	0	0	0	.....	22,900

[a] May 15–31.
[b] Nov. 1–19.
[c] Apr. 16–30.
[d] Apr. 10–30.
[e] Nov. 1–15.
[f] Mar. 11–30.
[g] Feb. 19–28.
[h] Nov. 1–12.
[j] Mar. 27–31.
[k] Nov. 1–15.
[m] Nov. 1–13.
[n] Mar. 24–31.
[o] Dec. 1–9.
[p] Mar. 8–31.
[q] Mar. 23–31.
[r] Nov. 1–10.
[s] Mar. 28–31.
[t] Estimated natural flow.

NOTE.—Means for periods less than a full month but exceeding 15 days were considered means for the month in finding average and median flow. The median flow given was obtained by arranging the monthly means in their order of magnitude and taking the middle mean; or, if the number was even, the average of the two middle means. By using daily discharge a considerably lower median discharge would be obtained. The total yearly flow in acre-feet has been averaged because in general the period of record covers the open-water season and the flow during months for which records are missing was usually small.

Mean flow for July, August, and September, 1917, obtained by subtracting the water diverted to Milk River by United States Reclamation Service St. Mary canal. A loss of 25 per cent was assumed between the outlet of the canal and Havre, and 8 days was assumed as the period of transit between the two points.

MILK RIVER AT CHINOOK, MONT.

LOCATION.—In sec. 34, T. 33 N., R. 19 E., at the wagon bridge over Milk River 1 mile south of Chinook, Mont.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—Three discharge measurements in 1897 and gage heights May 25 to October 23, 1897.

DISCHAGE MEASUREMENTS.—Made from highway bridge or by wading.

CHANNEL AND CONTROL.—Bed is composed of sand; shifts frequently.

EXTREMES OF STAGE.—Maximum stage recorded, 8.95 feet June 17, 1897; minimum stage recorded 0.5 foot August 27, 1897.

ICE.—Ice not present during the period of record.

DIVERSIONS.—Fort Belknap canal, the capacity of which is about 100 second-feet, diverts water from Milk River above this station.

REGULATION.—None.

ACCURACY.—Daily discharge was not computed because of insufficient discharge measurements. The station was moved to Havre in 1898.

Discharge measurements of Milk River at Chinook, Mont., 1897.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
May 25	Frank Beach	1.40	110
July 3	....do	2.30	460
Nov. 10	C. C. Babb	.72	34

Daily gage height, in feet, of Milk River at Chinook, Mont., 1897.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1	.....	1.15	2.80	0.50	0.10	0.40	17	.....	8.95	1.90	0.30	0.40	0.50
2	.....	1.10	2.60	.50	.10	.40	18	.....	.....	1.80	.30	.60	.30
3	.....	1.30	2.20	.40	.10	.40	19	.....	8.00	1.60	.30	.60	.40
4	.....	1.30	2.00	.50	.10	.30	20	.....	7.00	1.40	.30	.70	.40
5	.....	1.20	2.30	.60	.10	.20	21	.....	6.40	1.00	.20	.70	.40
6	.....	1.10	2.40	.70	.10	.10	22	.....	5.30	.90	.20	.60	.30
7	.....	1.00	2.50	.60	.10	.40	23	.....	5.00	1.00	.20	.50	.30
8	.....	.90	2.60	.60	.10	.50	24	.....	4.00	1.10	.10	.40	.....
9	.....	.90	3.30	.50	.10	.60	25	1.40	3.40	1.00	.10	.30	.....
10	.....	.80	3.10	.40	.10	.40	26	1.60	3.00	.90	.10	.20	.....
11	.....	.80	3.00	.40	.10	.50	27	1.50	3.10	.80	.05	.20	.....
12	.....	1.00	2.80	.30	.10	.40	28	1.50	3.40	.70	.10	.30	.....
13	.....	.90	2.60	.20	.10	.40	29	1.50	3.00	.80	.10	.20	.....
14	.....	.80	2.20	.40	.10	.40	30	1.40	3.20	.60	.10	.20	.....
15	.....	.80	2.00	.30	.10	.60	31	1.20	.....	.60	.10	.....	.....
16	.....	1.40	1.80	.30	.20	.40							

NOTE.—Station was moved to Havre, Mont., in 1898.

MILK RIVER AT MALTA, MONT.

LOCATION.—In NW. ¼ sec. 17, T. 30 N, R. 30 E., at old highway bridge at Malta, in Phillips County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—July 31, 1902, to December 31, 1917.

GAGE.—Chain fastened to guard rail on downstream side of bridge; read by employees of the United States Reclamation Service. The gage has been moved several times to different points on bridge, but datum was not changed.

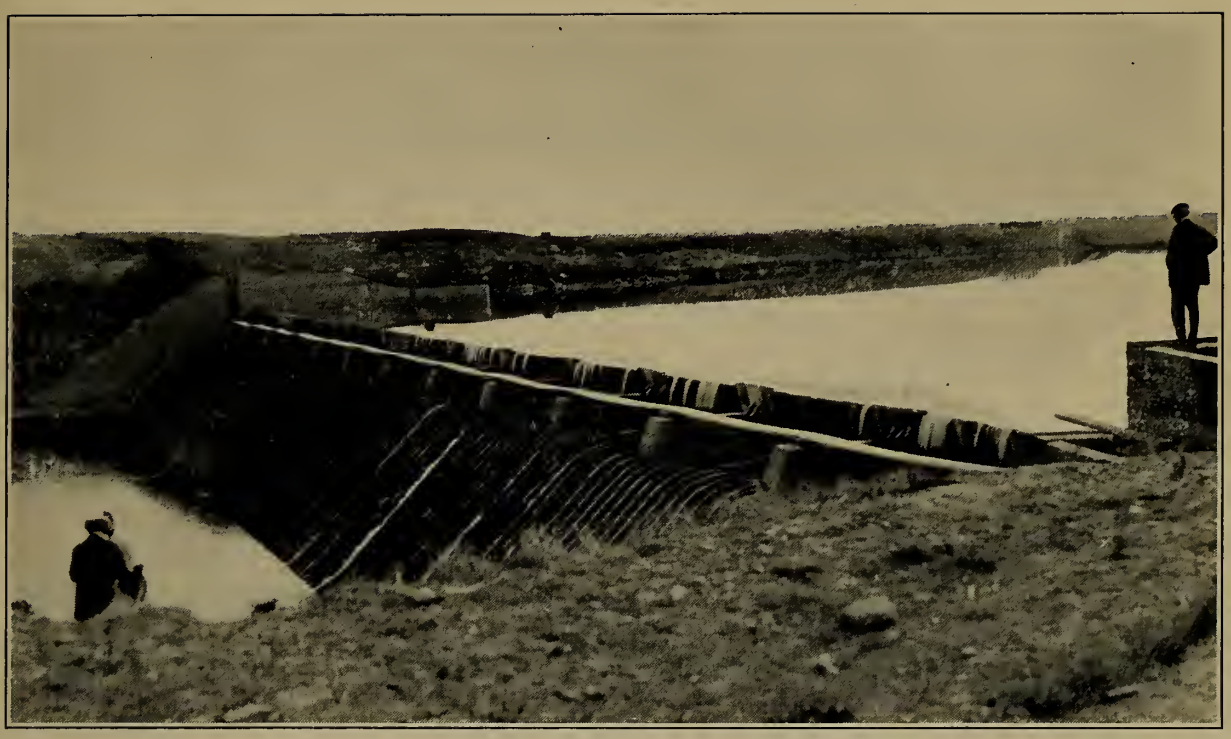
DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Bed of stream composed of gravel; permanent except for slight shifts at low stages. Partial control at gage at low water, but the principal control is formed by a bar or ridge that produces a riffle half a mile below the gage.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 19.75 feet April 10, 1917 (discharge, 11,200 second-feet); minimum stage recorded, channel reported dry August 13 to November 10, 1904; April 24 to May 8, and August 30 to end of year, 1905; April 10, 27–29, May 1, 4–23, 1906; July 16 to December 8, 1910. (See hydrographs, Pls. XVI–XVII.)

ICE.—Stage-discharge relation is affected by ice during winter months. Generally the flow is low from December to the spring break-up, which comes in March or April. Warm periods during the winter may cause sudden rises. When this happens, the open channel rating curve can be applied except when there are ice jams below.

DIVERSIONS.—Entire run-off from drainage basin above does not pass the station, for a large number of irrigation canals divert water from Milk River and its tributaries between Havre and Malta. The United States Reclamation Service has constructed a diversion dam (Pl. XV) at Dodson, about 17 miles above the station. The Dodson South canal, heading at this point, has a capacity of 900 second-feet, and the Dodson North canal a capacity of 200 second-feet.



A. DODSON DAM ON MILK RIVER NEAR DODSON, MONT., BETWEEN HAVRE AND MALTA. BEFORE INSTALLATION OF MOVABLE CREST GATES.

B. DODSON DAM ON MILK RIVER NEAR DODSON, MONT., BETWEEN HAVRE AND MALTA. MOVABLE CREST GATES AND SERVICE BRIDGE IN PLACE.

REGULATION.—Part of flood flow is diverted into Nelson reservoir and held for use in irrigation.

ACCURACY.—Stage-discharge relation permanent except for slight shifts of control at low stages and during winter season. Gage read twice daily to hundredths. Open-water records excellent; winter records considered fair.

Discharge measurements of Milk River at Malta, Mont., 1902–1917.

Date.	Made by—	Gage height.	Discharge.
1902.		*Feet.*	*Sec.-ft.*
July 31	C. T. Prall	2.50	525
Aug. 21	do	1.80	259
Sept. 10	do	1.40	166
25	F. E. Weymouth	1.50	165
Oct. 6	John T. Whistler	1.85	271
11	F. E. Weymouth	1.65	198
17	Cyrus C. Babb	1.67	174
24	John T. Whistler	1.60	171
31	George Drummond	1.70	257
Nov. 7	John T. Whistler	1.70	210
1903.			
Apr. 25	J. S. Baker	3.46	1,073
May 12	C. C. Babb	2.12	396
14	F. M. Brown	2.23	427
14	do	2.23	464
24	C. T. Prall	7.15	3,729
28	do	5.60	2,777
June 2	O. M. Sprigg	7.70	4,184
9	W. B. Freeman	4.25	1,753
16	S. B. Robbins	2.60	618
22	do	2.20	399
23	A. E. Place	2.20	501
July 8	do	2.24	357
15	do	2.64	479
21	E. W. Myers	2.32	266
21	do	2.32	271
Aug. 12	P. A. Blair	2.43	483
12	A. E. Place	2.43	496
Sept. 8	do	2.16	150
Oct. 8	do	1.74	73
Nov. 6	W. B. Freeman	1.72	148
12	do	1.55	130
26	do	1.33	88
Dec. 7	do	1.43	98
10	do	1.52	107
1904.			
Apr. 8	do	10.45	3,162
10	do	14.35	8,116
11	do	12.57	7,002
12	do	11.94	6,966
13	do	12.07	6,830
13	do	11.83	6,545
15	do	11.82	6,583
18	do	9.47	4,798
18	do	8.85	4,475
19	do	7.80	3,853
19	do	7.12	3,483
20	do	6.06	2,792
20	do	5.52	2,470
21	do	4.84	1,871
22	do	4.43	1,566
23	do	4.19	1,432
24	do	4.07	1,408
24	do	4.07	1,390
26	do	4.06	1,381
30	do	3.62	1,056
May 5	do	3.29	942
5	W. M. Neptune	3.29	850
17	Robert Follansbee	2.42	425
25	do	2.20	327
June 4	W. B. Freeman and E. C. Murphy.	2.37	503
6	Robert Follansbee	5.35	2,182
7	do	5.08	2,324
9	do	3.98	1,382
13	do	2.90	601
15	do	2.86	588
July 5	do	1.34	44
9	do	1.06	19
1904.			
July 20	Robert Follansbee	0.90	6.6
28	do	.71	1
1905.			
May 11	H. M. Morse	.73	4.6
June 28	C. T. Prall	1.25	52
July 24	W. B. Freeman	.80	5.0
29	do	1.19	40
Aug. 26	do	.72	2.0
26	do	.71	2.0
1906.			
Apr. 17	W. B. Freeman	.80	10
June 2	Freeman and Hartman	6.49	3,190
3	do	6.82	3,260
5	do	4.53	1,780
11	W. S. Hartman	17.65	10,600
11	do	17.56	9,720
13	do	16.66	9,740
13	Morse and Hartman	16.21	9,000
14	do	14.82	8,100
14	W. S. Hartman	14.03	7,980
16	do	9.28	4,920
16	do	7.90	3,970
July 11	do	2.53	416
26	do	1.41	78
Oct. 30	Follansbee and Richards	1.68	118
1907.			
Apr. 3	Follansbee and Pierson	10.86	3,000
7	do	19.11	10,200
8	J. B. Pierson	18.85	10,600
16	do	11.26	5,870
26	do	9.99	5,050
May 2	do	4.38	1,530
17	do	4.17	1,490
28	do	4.90	2,000
June 18	do	4.09	1,420
July 10	do	3.35	813
31	do	2.20	283
Aug. 20	do	1.54	82
28	do	1.35	68
Oct. 21	Follansbee and Stewart	1.71	100
1908.			
Apr. 8	Stewart and Huck	2.61	408
24	A. F. Huch	1.75	165
May 8	do	1.49	81.6
11	Stewart and Huch	1.40	72.4
28	A. F. Huch	2.20	158
June 8	do	5.05	2,100
26	do	3.72	1,320
July 9	do	2.37	317
Aug. 11	do	1.72	113
Sept. 29	do	1.55	117
1909.			
Apr. 23	Stewart and Lamb	2.15	308
May 4	W. A. Lamb	3.75	1,100
11	do	5.73	2,380
19	do	3.40	880
30	do	4.00	1,220
June 4	do	4.00	1,250
24	do	12.35	6,300
25	do	9.95	4,680
July 2	do	4.20	1,350
23	do	2.70	486
Aug. 23	do	1.70	132
Sept. 28	do	1.40	71
Oct. 2	do	1.45	90
Nov. 19	do	1.30	65

Discharge measurements of Milk River at Malta, Mont., 1902–1917—Continued.

Date.	Made by—	Gage height.	Discharge.
1910.		*Feet.*	*Sec.-ft.*
Mar. 29	Raymond Richards	3.65	1,050
Apr. 27	W. A. Lamb	1.32	54
May 12	M. E. McChristie	1.10	39
17	do	1.22	52
21	do	1.23	50
24	do	1.18	47
July 8	do	.50	.9
1911.			
Apr. 14	J. C. Beebe	1.75	155
29	do	1.62	115
May 18	do	1.47	67
June 13	do	2.05	208
30	do	1.02	17.9
July 1	do	4.38	1,560
2	do	4.13	1,380
3	do	3.56	972
31	do	1.24	34
Oct. 10	W. A. Lamb	2.98	557
1912.			
Apr. 2	do	17.4	5,830
4	do	15.88	7,020
6	B. E. Jones	16.58	9,120
18	do	10.09	5,040
29	do	4.15	1,260
May 20	R. R. Randell	3.08	726
June 17	do	2.89	594
July 28	do	1.81	168
Aug. 30	do	1.91	192
Nov. 15	do	1.88	172
1913.			
Mar. 21	do	3.30	266
Apr. 24	J. B. Stewart	5.05	2,050
May 5	do	3.65	975
22	do	3.78	968
June 18	do	2.37	318
July 15	do	2.23	218
28	do	1.34	40
Aug. 1	do	1.11	29
Sept. 19	W. Lamb	1.20	27
Nov. 13	do	1.89	152
1914.			
May 5	B. E. Jones	1.16	32
June 3	do	.91	10
18	do	1.39	49
1915.			
Apr. 8	do	6.40	2,830
May 5	do	1.05	27.3
7	do	1.03	25.6
June 15	do	3.04	632
July 27	do	2.58	416
31	do	2.18	244
Nov. 20	W. A Lamb	1.79	130
1916.			
Jan. 30	do	2.0	25
Feb. 25	do	12.11	3,580
Mar. 17	do	16.21	6,140
Apr. 11	A. H. Tuttle	3.28	805
May 2	do	2.20	255
19	do	1.14	56
29	do	4.03	1,280
July 24	do	3.22	740
Aug. 17	do	2.91	568
22	do	2.54	375
Oct. 6	do	1.84	139
Dec. 20	W. A. Lamb	2.16	137
1917.			
Apr. 2	Anderson-Tuttle	14.6	4,240
5	do	16.04	5,270
7	do	16.9	9,130
8	do	15.28	8,440
20	M. D. Anderson	15.65	8,410
21	do	10.97	5,630
May 19	A. H. Tuttle	6.75	3,150
June 1	do	3.94	1,180
15	do	3.17	713
Aug. 8	do	1.13	53.6

NOTE.—1904: April 8, stage-discharge relation affected by ice gorge. July 28, discharge estimated.
1905: July 24, discharge estimated.
1907: April 3, stage-discharge relation affected by ice gorge. April 7, floating ice in stream.
1908: May 28, measurement not considered good.
1909: November 19, channel partly frozen.
1912: April 2, ice present. April 4, floating ice; stage-discharge relation probably not affected.
1913: March 21, ice present.
1915: November 20, ice along banks, control open.
1916: January 30, measurement made from ice cover at gage; channel free from slush and anchor ice; temperature 40° below zero; no water under gage; gage height estimated at 2.0 feet. February 25 and March 17, stage-discharge relation seriously affected by ice on control.

Daily discharge, in second-feet, of Milk River at Malta, Mont., 1902–1917.

Day.	Aug.	Sept.	Oct.	Nov.	Day	Aug.	Sept.	Oct.	Nov.
1902.					1902.				
1	446	251	212	173	16	212	109	173	.....
2	485	212	212	173	17	212	109	173	.....
3	446	212	212	173	18	251	109	173	.....
4	407	212	212	173	19	251	109	173	.....
5	368	212	212	173	20	212	109	173	.....
6	368	212	212	173	21	232	109	173	.....
7	368	212	212	173	22	251	109	173	.....
8	368	173	212	212	23	212	109	173	.....
9	368	148	212	.....	24	251	109	173	.....
10	329	148	251	.....	25	251	109	173	.....
11	305	148	251	.....	26	251	127	173	.....
12	290	127	173	.....	27	251	127	173	.....
13	290	109	173	.....	28	212	109	173	.....
14	290	109	173	.....	29	212	109	173	.....
15	290	109	173	.....	30	212	127	173	.....
					31	212	.....	173	.....

Daily discharge, in second-feet, of Milk River at Malta, Mont., 1902–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1903.										
1	.....	3,355	1,220	2,900	325	185	770	150	150	86
2	.....	3,215	1,150	4,170	435	228	655	150	185	86
3	.....	2,970	1,115	2,900	380	275	600	150	185	86
4	.....	2,375	1,010	2,200	380	325	490	150	185	86
5	.....	2,375	890	1,990	380	435	435	150	150	86
6	.....	3,320	770	1,990	380	435	380	150	150	94
7	.....	2,410	655	1,990	325	545	380	150	150	94
8	.....	2,480	545	1,955	408	655	380	150	150	94
9	.....	2,305	490	1,640	408	655	325	167	120	94
10	.....	2,305	435	1,395	435	600	275	167	150	104
11	.....	2,200	435	1,255	600	600	275	150	150	.....
12	.....	2,200	380	1,115	682	490	275	150	120	.....
13	.....	2,060	380	980	710	435	228	167	120	.....
14	.....	1,955	380	920	628	380	228	167	120	.....
15	.....	1,710	380	800	600	380	185	185	120	.....
16	.....	1,465	380	628	628	325	185	228	110	.....
17	.....	1,255	380	600	600	225	185	228	110	.....
18	.....	1,080	380	545	600	275	185	228	110	.....
19	.....	920	380	490	545	275	228	228	110	.....
20	.....	830	490	435	462	275	275	228	110	.....
21	.....	830	655	380	435	275	228	228	110	.....
22	.....	860	1,360	325	380	275	228	228	110	.....
23	.....	950	2,830	325	325	275	228	206	99	.....
24	.....	1,010	3,770	325	325	275	206	206	90	.....
25	.....	1,080	3,850	325	275	228	206	206	90	.....
26	.....	1,080	3,890	275	228	228	206	206	90	.....
27	.....	1,045	3,570	300	185	380	185	206	90	.....
28	.....	950	2,655	275	150	770	185	150	86	.....
29	.....	1,185	2,480	325	150	710	185	150	94	.....
30	2,725	1,290	2,340	325	150	655	185	150	94	.....
31	2,725	.....	2,200	.....	150	770	.....	150	.....	.....
1904.										
1	.....	.....	1,118	254	45	1	.....	.....	.....	15
2	.....	.....	1,118	294	45	1	.....	.....	.....	15
3	.....	.....	1,054	254	45	1	.....	.....	.....	15
4	.....	.....	1,054	254	45	1	.....	.....	.....	15
5	.....	.....	926	1,735	45	1	.....	.....	.....	15
6	.....	.....	864	2,190	45	1	.....	.....	.....	15
7	.....	.....	806	1,605	34	1	.....	.....	.....	15
8	.....	.....	750	1,345	24	1	.....	.....	.....	15
9	.....	.....	750	1,022	19	1	.....	.....	.....	15
10	.....	.....	696	894	19	1	.....	.....	.....	15
11	.....	7,080	696	670	19	1	.....	.....	45	15
12	.....	6,660	644	670	15	1	.....	.....	45	15
13	.....	6,730	592	670	15	.....	.....	.....	45	15
14	.....	6,310	544	618	15	.....	.....	.....	34	15
15	.....	6,310	496	618	15	.....	.....	.....	24	15
16	.....	6,310	448	568	15	.....	.....	.....	15	15
17	.....	6,450	402	424	8	.....	.....	.....	15	15
18	.....	4,910	358	380	8	.....	.....	.....	15	15
19	.....	3,910	358	336	8	.....	.....	.....	15	15
20	.....	2,675	358	294	8	.....	.....	.....	15	15
21	.....	1,895	402	294	8	.....	.....	.....	15	15
22	.....	1,635	336	254	6	.....	.....	.....	15	15
23	.....	1,505	472	214	4	.....	.....	.....	15	15
24	.....	1,375	380	174	4	.....	.....	.....	15	15
25	.....	1,375	336	136	4	.....	.....	.....	15	15
26	.....	1,375	294	102	4	.....	.....	.....	15	15
27	.....	1,375	214	102	4	.....	.....	.....	15	15
28	.....	1,375	214	76	1	.....	.....	.....	15	15
29	.....	1,180	254	58	1	.....	.....	.....	15	15
30	.....	1,054	294	45	1	.....	.....	.....	15	15
31	.....	.....	294	.....	1	.....	.....	.....	.....	24

Daily discharge, in second-feet, of Milk River at Malta, Mont., 1902–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1905.									
1	336	29	0	19	236	696	.....	.....	.....
2	336	29	0	12	85	593	.....	.....	.....
3	424	29	0	6	24	358	.....	.....	.....
4	424	19	0	12	16	236	.....	.....	.....
5	520	29	0	12	16	236	.....	.....	.....
6	618	29	0	12	16	167	.....	.....	.....
7	472	19	0	12	9	109	.....	.....	.....
8	380	12	0	12	9	65	.....	.....	.....
9	294	12	1	19	24	85	.....	.....	.....
10	472	6	1	29	136	85	.....	.....	.....
11	254	6	1	29	85	85	.....	.....	.....
12	294	1	1	29	35	48	.....	.....	.....
13	254	1	1	29	136	48	.....	.....	.....
14	254	1	1	19	85	35	.....	.....	.....
15	254	1	1	19	35	35	.....	.....	.....
16	217	1	1	19	24	35	.....	.....	.....
17	217	1	1	19	24	24	.....	.....	.....
18	254	1	1	19	24	24	.....	.....	.....
19	294	1	1	19	24	24	.....	.....	.....
20	183	1	1	19	24	4	.....	.....	.....
21	183	1	1	19	16	4	.....	.....	.....
22	183	1	1	19	16	4	.....	.....	.....
23	183	1	1	19	16	4	.....	.....	.....
24	151	0	6	19	9	.5	.....	.....	.....
25	151	0	6	12	9	.5	.....	.....	.....
26	96	0	6	6	9	.5	.....	.....	.....
27	74	0	12	19	24	.5	.....	.....	.....
28	74	0	19	56	24	.5	.....	.....	.....
29	56	0	19	56	48	.5	.....	.....	.....
30	56	0	19	217	35	0	.....	.....	.....
31	29	.....	19	.....	750	0	.....	.....	.....
1906.									
1	.....	.....	0	1,800	2,000	39	19	28	69
2	.....	.....	1	2,800	1,600	39	28	28	69
3	.....	.....	1	3,310	1,200	39	28	28	69
4	.....	.....	0	1,800	1,000	39	28	23	69
5	.....	.....	0	1,330	875	39	23	28	69
6	.....	.....	0	1,330	751	39	28	28	69
7	.....	.....	0	1,330	691	23	28	19	69
8	.....	.....	0	10,400	631	23	28	19	69
9	.....	19	0	10,900	517	28	28	19	69
10	.....	19	0	10,700	463	19	28	19	69
11	.....	28	0	9,840	412	19	28	19	69
12	.....	39	0	10,400	364	19	28	19	69
13	.....	39	0	10,300	210	19	28	19	78
14	.....	39	0	8,700	280	19	39	28	87
15	.....	39	0	6,890	180	19	39	28	87
16	.....	28	0	4,450	153	19	412	28	87
17	.....	19	0	2,600	107	19	320	28	87
18	.....	19	0	2,000	107	12	210	28	87
19	.....	12	0	1,700	107	12	87	39	87
20	.....	6	0	1,400	87	12	69	39	87
21	.....	6	0	1,200	87	12	53	39	69
22	.....	6	0	1,100	87	19	39	39	69
23	.....	6	0	1,100	69	19	39	39	69
24	.....	1	6	1,230	53	19	39	19	69
25	.....	1	87	1,430	39	19	39	19	69
26	.....	1	691	1,730	39	19	39	19	69
27	.....	0	691	1,600	39	19	39	19	69
28	.....	0	463	4,610	39	19	28	24	69
29	.....	0	463	3,840	39	19	28	28	69
30	.....	1	1,200	2,740	39	19	28	129	69
31	.....	.....	1,330	.....	39	19	.....	87	.....

Daily discharge, in second-feet, of Milk River at Malta, Mont., 1902–1917—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1907.								
1	3,000	1,620	995	2,320	172	334	218	126
2	3,000	1,560	1,030	1,970	187	158	202	133
3	3,000	1,400	995	1,800	178	121	187	140
4	6,500	1,180	945	1,660	172	91	158	142
5	10,100	964	900	1,440	145	82	150	145
6	11,000	819	856	1,260	126	79	145	145
7	10,900	995	806	1,180	126	70	140	137
8	10,600	1,260	774	1,110	140	67	136	129
9	10,700	1,250	743	1,010	121	64	133	121
10	11,200	1,220	680	919	117	61	133	116
11	11,100	1,200	712	900	110	70	130	110
12	10,500	1,150	680	869	104	79	126	105
13	9,680	1,180	743	793	100	91	126	100
14	7,670	1,280	838	712	96	100	121	98
15	6,070	1,370	869	756	89	121	121	96
16	5,850	1,440	1,170	819	82	126	121	96
17	6,220	1,450	1,500	900	78	140	117	86
18	5,920	1,370	1,370	774	74	145	119	86
19	5,060	1,280	1,170	730	70	133	121	84
20	4,460	1,250	964	693	91	145	121	82
21	4,460	1,230	932	618	96	158	121	82
22	3,520	1,200	806	588	86	172	121	82
23	4,300	1,250	838	531	74	170	119	82
24	4,870	1,440	2,320	492	70	167	117	82
25	5,640	2,160	3,880	450	67	145	114	80
26	5,200	2,130	5,830	411	67	133	110	79
27	4,740	2,100	4,490	401	65	150	113	79
28	3,590	1,880	3,960	378	61	172	117	79
29	2,070	1,640	3,390	334	61	209	119	76
30	1,990	1,440	2,870	304	74	218	121	74
31	.....	1,250	.....	254	401	.....	126	.....
1908.								
1	350	98	401	899	165	140	114	200
2	350	93	450	834	135	150	104	218
3	375	90	503	751	112	140	119	232
4	400	90	589	626	80	130	114	249
5	400	87	740	531	112	127	124	266
6	400	84	995	477	123	127	136	275
7	425	82	1,400	430	113	130	151	310
8	445	79	1,660	348	123	130	151	315
9	530	74	2,820	295	113	127	172	312
10	682	67	4,000	290	113	125	186	310
11	762	65	4,890	260	110	116	200	300
12	672	55	5,720	244	113	104	218	300
13	612	55	6,410	212	110	94	218	290
14	525	53	5,900	188	110	94	218	300
15	460	49	4,070	188	110	98	209	300
16	405	44	3,100	182	106	94	218	300
17	365	42	2,950	182	95	94	226	290
18	260	39	2,760	165	82	98	226	290
19	232	36	2,600	165	80	94	232	290
20	200	34	2,410	160	85	104	249	282
21	375	74	2,030	165	100	100	266	275
22	290	172	1,560	202	101	104	249	275
23	226	235	1,440	218	133	114	232	315
24	175	292	1,250	202	140	124	239	345
25	140	355	1,120	188	145	137	232	380
26	142	253	1,120	196	126	149	218	392
27	119	196	1,090	212	133	130	209	470
28	100	272	990	210	133	130	200	315
29	110	202	930	202	121	124	193	193
30	100	382	836	196	126	119	186	186
31	.....	410	.....	196	128	.....	193	.....

Daily discharge, in second-feet, of Milk River at Malta, Mont., 1902–1917—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1909.									
1	962	404	1,960	1,440	991	80	80	116	.....
2	846	962	1,660	1,370	760	186	65	116	.....
3	788	1,240	1,440	1,370	649	137	80	116	.....
4	904	1,050	1,240	1,240	1,050	116	80	116	.....
5	962	875	1,050	1,170	991	80	80	116	.....
6	962	649	760	1,050	760	75	80	116	.....
7	1,200	545	596	933	649	70	65	116	.....
8	1,080	1,020	545	1,520	545	65	65	116	.....
9	846	2,860	596	2,040	449	72	65	116	.....
10	622	3,060	596	1,890	404	65	65	116	.....
11	426	2,450	649	1,370	361	65	65	116	.....
12	520	1,590	817	1,110	361	65	65	116	.....
13	570	1,240	817	1,300	320	65	65	80	.....
14	472	1,050	760	1,050	282	65	65	80	.....
15	472	991	1,050	875	282	52	65	65	.....
16	382	875	1,140	817	247	65	65	65	.....
17	301	933	991	760	215	65	65	65	.....
18	301	933	875	704	215	80	65	65	.....
19	382	875	760	596	215	80	52	65	.....
20	382	1,300	1,240	596	215	80	116	65	.....
21	340	1,820	3,260	545	186	80	116	65	.....
22	264	1,740	4,770	596	160	80	97	65	.....
23	247	1,590	6,820	545	137	80	97	65	.....
24	247	1,980	6,980	449	137	80	97	65	.....
25	282	2,380	4,950	404	116	80	97	65	.....
26	282	3,720	3,190	361	116	80	97	80	.....
27	282	4,650	2,450	320	97	80	97	80	.....
28	320	4,860	2,320	320	97	80	97	80	.....
29	404	3,980	1,960	320	97	65	116	80	.....
30	361	2,920	1,820	320	80	65	116	80	.....
31	.....	2,240	.....	933	80	.....	116	.....	.....
1910.									
1	570	40	116	1	.....	.....	.....	.....	.....
2	472	29	80	1	.....	.....	.....	.....	.....
3	472	40	80	1	.....	.....	.....	.....	.....
4	382	40	80	1	.....	.....	.....	.....	.....
5	231	40	65	1	.....	.....	.....	.....	.....
6	231	40	65	1	.....	.....	.....	.....	.....
7	301	40	65	1	.....	.....	.....	.....	.....
8	382	40	40	1	.....	.....	.....	.....	.....
9	340	40	29	1	.....	.....	.....	.....	1
10	200	40	29	1	.....	.....	.....	.....	4
11	126	40	21	2.5	.....	.....	.....	.....	4
12	88	40	14	1	.....	.....	.....	.....	1
13	106	40	14	1	.....	.....	.....	.....	1
14	126	40	8	1	.....	.....	.....	.....	1
15	106	40	8	.5	.....	.....	.....	.....	1
16	88	52	4	.....	.....	.....	.....	.....	1
17	88	65	4	.....	.....	.....	.....	.....	1
18	72	40	4	.....	.....	.....	.....	.....	.....
19	58	40	4	.....	.....	.....	.....	.....	.....
20	34	52	4	.....	.....	.....	.....	.....	.....
21	34	65	1	.....	.....	.....	.....	.....	.....
22	34	52	1	.....	.....	.....	.....	.....	.....
23	58	40	1	.....	.....	.....	.....	.....	.....
24	58	52	1	.....	.....	.....	.....	.....	.....
25	58	52	1	.....	.....	.....	.....	.....	.....
26	58	52	1	.....	.....	.....	.....	.....	.....
27	65	65	1	.....	.....	.....	.....	.....	.....
28	65	65	1	.....	.....	.....	.....	.....	.....
29	52	80	1	.....	.....	.....	.....	.....	.....
30	40	80	1	.....	.....	.....	.....	.....	.....
31	.....	116	.....	.....	.....	.....	.....	.....	.....

Daily discharge, in second-feet, of Milk River at Malta, Mont., 1902–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1911.									
1	.....	309	44	472	1,540	36	36	472	199
2	.....	346	327	405	1,210	29	31	448	141
3	.....	274	327	385	825	26	31	448	161
4	.....	241	346	327	660	24	42	426	181
5	.....	210	309	309	930	22	68	426	241
6	.....	181	257	274	895	22	2,100	448	164
7	.....	167	210	274	572	20	3,320	520	86
8	.....	154	181	291	520	141	5,250	495	.....
9	.....	129	149	241	520	16	6,540	572	.....
10	.....	129	129	210	472	18	6,860	630	.....
11	.....	129	112	195	365	16	5,980	520	.....
12	.....	129	94	195	225	20	4,160	448	.....
13	.....	154	76	195	167	26	2,780	448	.....
14	.....	129	76	167	89	31	1,960	426	.....
15	.....	117	76	141	54	31	1,620	426	.....
16	.....	117	71	110	47	117	1,540	385	.....
17	.....	117	60	76	44	195	1,280	385	.....
18	.....	86	89	44	36	216	1,100	346	.....
19	.....	86	102	36	39	195	860	365	.....
20	.....	95	154	29	42	167	692	309	.....
21	.....	68	141	26	36	181	630	309	.....
22	.....	42	790	22	36	141	572	309	.....
23	.....	39	895	15	31	106	545	309	.....
24	.....	35	660	106	42	102	472	291	.....
25	758	31	520	68	47	95	495	282	.....
26	630	54	472	54	31	102	520	274	.....
27	426	68	1,210	42	26	210	692	291	.....
28	758	86	1,280	31	225	159	692	300	.....
29	692	102	1,280	18	76	76	630	309	.....
30	274	102	825	725	47	54	545	283	.....
31	129	.....	630	.....	42	51	.....	257	.....
1912.									
1	.....	5,500	1,340	1,620	255	148	255	190	220
2	.....	5,830	1,280	1,480	238	190	195	190	212
3	.....	6,000	1,070	1,340	220	148	135	205	205
4	.....	7,020	1,140	1,410	780	148	135	220	212
5	.....	8,930	1,280	1,070	450	135	135	212	220
6	.....	9,120	1,540	1,070	365	148	155	205	205
7	.....	9,120	3,060	870	565	160	175	198	190
8	.....	9,120	2,100	750	450	148	155	190	205
9	.....	9,060	1,820	668	450	148	135	205	220
10	.....	9,060	1,540	780	405	148	148	220	220
11	.....	9,120	1,340	668	325	148	160	212	220
12	.....	9,120	1,140	590	220	160	148	205	238
13	.....	9,260	1,140	450	205	148	135	205	255
14	.....	9,320	1,210	472	135	148	135	205	230
15	.....	7,890	1,070	472	135	148	135	198	205
16	.....	6,180	1,000	518	160	148	110	190	198
17	.....	5,700	565	668	190	148	116	190	190
18	.....	5,160	540	750	190	162	122	190	198
19	.....	4,820	840	935	190	175	116	205	205
20	.....	3,680	695	840	160	308	110	220	212
21	.....	2,860	780	640	160	356	122	220	220
22	.....	2,180	810	590	175	405	135	220	220
23	.....	1,900	810	495	190	365	135	205	220
24	.....	1,760	870	405	190	325	135	190	220
25	.....	1,540	935	385	175	308	135	214	220
26	.....	1,410	935	405	190	290	135	238	205
27	.....	1,410	870	385	190	290	142	216	190
28	.....	1,340	935	308	160	290	148	255	162
29	.....	1,410	1,620	290	160	210	169	238	135
30	.....	1,280	1,960	238	148	190	190	220	135
31	.....	.....	2,040	.....	135	255	.....	220	.....

Daily discharge, in second-feet, of Milk River at Malta, Mont., 1902–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1913.										
1	.....	.....	988	.....	382	17	76	31	281	.....
2	.....	.....	1,060	.....	601	8	76	31	152	.....
3	.....	.....	988	.....	601	8	76	31	152	.....
4	.....	.....	1,000	448	688	8	64	31	127	.....
5	.....	.....	988	426	601	17	51	31	127	.....
6	.....	2,650	988	404	601	17	51	41	127	.....
7	.....	2,520	916	382	781	17	40	41	152	.....
8	.....	2,520	781	360	916	31	31	41	152	.....
9	.....	2,580	718	360	781	31	31	41	152	.....
10	.....	2,650	.....	319	522	31	31	41	152	.....
11	.....	2,780	.....	319	319	31	31	41	152	85
12	.....	2,450	.....	319	263	31	31	41	152	.....
13	.....	2,450	.....	319	263	31	31	53	152	68
14	.....	2,380	.....	319	263	17	31	53	152	.....
15	.....	2,860	.....	319	152	17	31	60	152	.....
16	.....	3,330	.....	319	109	17	31	76	152	68
17	.....	3,800	.....	319	109	17	31	105	152	.....
18	.....	4,100	.....	318	109	8	31	85	152	.....
19	.....	4,040	.....	360	109	8	31	85	152	.....
20	.....	3,560	.....	263	76	31	51	85	152	.....
21	.....	3,500	.....	263	76	17	31	85	152	.....
22	.....	2,450	968	382	76	17	36	85	152	.....
23	.....	2,100	.....	382	51	84	31	85	152	.....
24	.....	1,960	.....	522	51	152	31	105	127	.....
25	.....	1,900	.....	382	51	152	31	105	127	.....
26	.....	1,900	.....	382	51	152	41	105	127	.....
27	.....	1,680	.....	382	31	152	41	105	105	.....
28	.....	1,410	.....	319	31	112	41	127	105	.....
29	.....	1,280	.....	319	31	112	41	152	85	.....
30	.....	1,140	.....	448	31	76	41	211	85	.....
31	.....	.....	.....	.....	17	76	.....	360	.....	.....
1914.										
1	.....	360	38	11	281	21	12	17.0	211	76
2	.....	360	43	12	211	22	12	17.6	186	80
3	.....	382	30	13	155	21	12	18.2	199	71
4	.....	382	29	13	132	19	14	18.8	155	70
5	.....	688	25	14	125	18	12	17.6	132	67
6	.....	688	21	18	116	17	11	17.0	120	64
7	.....	814	21	18	78	16	10	17.6	150	64
8	.....	688	21	15	42	15	9	17.6	130	.....
9	.....	630	21	16	29	15	9	16.0	107	.....
10	.....	574	21	14	35	14	9	16.5	109	.....
11	.....	601	21	16	33	13	8	28	89	.....
12	.....	688	17	18	28	11	8	750	89	.....
13	.....	688	16	180	33	12	21	847	95	.....
14	.....	630	16	506	29	14	16	601	82	.....
15	.....	547	14	344	28	12	16	472	54	.....
16	.....	426	13	140	27	12	16	403	60	.....
17	.....	340	16	76	25	11	12	315	52	.....
18	.....	228	14	46	22	11	12	277	169	.....
19	.....	76	16	37	21	16	11	228	155	.....
20	.....	496	14	34	24	29	11	196	132	.....
21	.....	688	11	32	22	26	12	172	150	.....
22	.....	574	10	32	22	22	11	147	225	.....
23	847	448	11	31	22	16	11	150	140	.....
24	988	382	12	33	22	16	11	140	99	.....
25	574	281	13	35	21	12	11	140	80	.....
26	630	263	14	53	21	12	12	202	73	.....
27	574	245	13	125	21	14	12	245	71	.....
28	448	158	12	166	21	13	13	270	71	.....
29	382	47	14	448	21	14	15	263	71	.....
30	426	36	13	360	21	14	16	238	83	.....
31	382	.....	12	.....	21	14	.....	214	.....	.....

Daily discharge, in second-feet, of Milk River at Malta, Mont., 1902–1917—Continued.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1915.											
1	.....	.....	3,840	36	93	385	247	216	210	225	106
2	.....	.....	3,440	36	89	495	346	204	195	210	110
3	.....	.....	4,890	43	85	630	426	175	195	210	127
4	.....	.....	5,610	36	85	572	426	159	195	210	127
5	.....	.....	5,860	36	108	495	448	167	195	195	120
6	.....	.....	4,830	31	118	426	385	134	195	195	120
7	.....	.....	3,680	31	216	385	385	130	195	195	120
8	.....	.....	2,990	29	426	385	365	130	210	195	120
9	.....	.....	2,720	27	472	346	302	141	225	195	120
10	.....	.....	2,450	31	790	365	257	189	225	195	120
11	.....	.....	1,760	23	1,280	385	204	187	225	184	120
12	.....	.....	1,340	23	1,280	495	195	309	225	127	120
13	.....	.....	1,000	25	1,140	472	159	385	225	132	120
14	.....	.....	725	34	860	426	134	385	241	132	120
15	.....	.....	660	36	630	448	123	327	257	132	120
16	.....	.....	346	31	572	572	725	281	257	132	120
17	.....	.....	98	31	472	630	1,280	281	291	144	120
18	.....	.....	60	27	520	1,480	309	274	291	144	120
19	.....	.....	43	29	572	1,210	204	257	291	144	.....
20	.....	.....	49	36	545	1,210	189	274	291	132	.....
21	.....	.....	46	25	472	1,210	167	281	307	132	.....
22	.....	385	51	29	426	1,140	210	281	291	132	.....
23	.....	385	69	31	520	825	274	274	291	132	.....
24	.....	3,120	58	46	600	630	385	267	274	120	.....
25	.....	3,980	64	108	600	472	600	274	274	120	.....
26	.....	3,740	58	187	472	346	520	247	274	120	.....
27	.....	3,980	55	187	472	426	405	241	257	120	.....
28	.....	4,410	46	159	472	346	338	235	257	120	.....
29	.....	4,290	46	130	426	274	302	216	257	120	.....
30	.....	4,100	40	141	448	274	298	225	257	120	.....
31	.....	4,230	.....	118	.....	235	247	.....	241	.....	.....
1916.											
1	.....	3,140	4,350	159	1,900	4,290	895	205	159	327	180
2	.....	3,800	3,380	177	2,100	4,290	825	190	167	327	180
3	.....	3,060	2,580	177	2,320	4,040	758	164	180	327	180
4	.....	2,650	2,040	177	2,320	4,040	692	164	180	327	180
5	.....	2,450	1,620	164	2,180	4,890	630	164	167	327	180
6	.....	2,180	1,340	164	2,100	5,400	520	137	150	327	177
7	.....	1,820	1,140	155	1,900	5,220	472	133	155	308	174
8	.....	1,480	1,070	155	1,760	4,890	448	159	174	290	171
9	.....	1,340	825	111	1,620	4,230	426	220	254	290	168
10	.....	1,280	825	114	1,280	3,260	385	346	327	290	165
11	.....	1,620	758	106	1,340	2,780	346	545	365	237	162
12	.....	2,250	692	106	1,340	2,720	385	660	426	220	159
13	.....	4,200	630	79	1,340	2,720	630	520	545	220	156
14	.....	5,000	600	72	1,410	2,240	660	426	600	220	153
15	.....	5,250	572	52	1,480	1,820	572	385	472	220	150
16	.....	6,000	572	52	1,540	1,760	520	346	426	205	147
17	254	6,140	600	52	1,680	1,680	520	308	385	180	144
18	254	5,900	572	52	1,680	1,680	495	272	385	167	141
19	1,960	6,450	572	56	1,620	1,620	472	254	365	167	139
20	2,750	6,400	520	56	1,480	1,340	426	220	365	167	137
21	3,450	4,500	495	52	1,280	1,480	365	220	346	180	.....
22	3,530	4,270	495	48	1,070	1,410	346	220	365	180	.....
23	3,450	4,040	448	48	1,210	1,140	220	205	365	180	.....
24	3,450	5,220	346	48	1,140	860	96	190	365	190	.....
25	3,580	5,830	220	57	1,210	825	74	177	365	190	.....
26	3,530	5,340	83	123	1,410	692	74	164	365	190	.....
27	3,400	4,410	56	91	1,480	630	101	164	346	180	.....
28	3,300	3,380	45	164	1,410	600	145	164	327	180	.....
29	2,680	4,040	45	1,480	1,900	660	190	143	327	180	.....
30	.....	4,650	56	1,900	4,290	1,140	220	143	327	180	.....
31	.....	5,220	.....	2,040	.....	1,140	205	.....	327	.....	.....

Daily discharge, in second-feet, of Milk River at Malta, Mont., 1902–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1917.									
1	.....	4,100	2,650	1,280	104	55	64	164	152
2	.....	4,300	2,520	1,280	104	55	64	131	141
3	.....	4,200	2,320	1,280	104	55	64	112	141
4	.....	4,500	2,100	1,280	97	55	64	164	141
5	.....	5,700	1,820	1,410	97	51	64	237	164
6	.....	10,100	1,680	1,410	104	48	64	237	177
7	.....	9,580	1,680	1,410	104	51	64	237	205
8	.....	8,470	1,960	1,410	104	55	64	254	205
9	.....	8,280	1,680	725	68	59	64	220	205
10	.....	8,020	1,760	495	68	64	68	205	220
11	.....	7,890	2,180	860	68	68	73	190	237
12	.....	8,020	2,520	790	64	78	73	177	237
13	.....	8,150	3,060	790	59	79	78	177	237
14	.....	8,280	3,500	725	55	97	78	177	254
15	.....	8,340	3,740	725	59	104	90	164	254
16	.....	8,540	3,920	758	55	164	90	152	254
17	.....	8,670	3,800	895	55	141	90	141	254
18	.....	8,800	3,260	1,280	55	97	90	141	205
19	.....	8,360	2,990	1,210	55	79	90	152	205
20	.....	8,410	2,780	1,000	59	78	97	141	205
21	.....	6,060	2,650	965	68	68	104	152	220
22	.....	4,710	2,380	545	64	64	90	190	237
23	.....	3,560	1,960	545	64	59	84	725	272
24	.....	3,440	1,820	426	64	59	78	545	254
25	.....	3,800	1,680	327	64	64	73	237	237
26	.....	4,290	1,540	112	59	68	68	177	205
27	.....	4,530	1,410	112	64	68	64	177	190
28	.....	4,040	1,410	112	59	64	90	152	177
29	.....	3,860	1,410	112	59	64	177	152	177
30	1,000	2,860	1,280	104	59	68	220	152	190
31	2,800	.....	1,280	.....	55	64	.....	141	.....

NOTE.—1903: Dec. 11–31, records omitted from compilation because open-channel rating curve was used to determine discharge, although stage-discharge relation was affected by ice; records Nov. 16–22 revised for same reason.

1904: Apr. 1–10, records omitted from compilation because based on open-channel rating curve, though stage-discharge relation was affected by ice. Aug. 13 to Nov. 10, no flow.

1905: No flow Aug. 30 to Dec. 31.

1906: No flow Jan. 1 to Apr. 8. River frozen over Nov. 29 to Dec. 31.

1907: Apr. 1–4, stage-discharge relation affected by ice gorge; discharge estimated.

1908: Apr. 1–7, discharge estimated.

1909: Nov. 28–30, stage-discharge relation affected by ice; discharge estimated.

1910: No flow July 16 to Dec. 8.

1911: Mar. 1–24, discharge estimated at 165 second-feet. Nov. 8–30, discharge estimated at 85 second-feet.

1912: Apr. 1–4, stage-discharge relation affected by ice; discharge estimated.

1913: Discharge estimated as follows: May 10–21, 1,260 second-feet; May 23–31, 975 second-feet; June 1–3, 550 second-feet. Gage heights June 10 to Sept. 21 read on chain gage at new highway bridge about 300 yards above station; gage heights at station were obtained from a curve showing the relation between the two gages.

1914: Mar. 5–22, stage-discharge relation affected by ice; considerable run-off, but quantity could not be accurately estimated. Mar. 23–31, stage-discharge relation possibly affected by ice, but open-channel rating curve assumed applicable.

1915: Apr. 1, ice jam below gage.

1916: Feb. 20 to Mar. 22 and Dec. 6–20, stage-discharge relation affected by ice.

1917: Mar. 30 to Apr. 5, stage-discharge relation affected by ice; discharge estimated.

Monthly discharge of Milk River at Malta, Mont., 1902–1917.

Month.	Discharge in second-feet.			Run-off (in acre-feet).
	Maximum.	Minimum.	Mean.	
1902.				
August	485	212	294	18,056
September	251	109	143	8,509
October	251	173	189	11,620
November 1–8	.....	.....	178	2,822
The period	.....	.....	.....	41,007
1903.				
April	3,355	830	1,769	105,263
May	3,890	380	1,350	83,008
June	4,170	275	1,136	67,597
July	710	150	408	25,087
August	770	185	417	25,640
September	770	185	299	17,792
October	228	150	180	11,068
November	228	86	124	7,379
December 1–10	.....	.....	91	1,805
The period	.....	.....	.....	344,639
1904.				
April 11–30	.....	.....	3,574	141,779
May	1,118	214	565	34,740
June	2,190	45	552	32,846
July	45	1	17	1,045
August	1	0	1	61
September	0	0	0	0
October	0	0	0	0
November	45	0	14	833
December	24	15	15	922
The period	.....	.....	.....	212,226
1905.				
March	618	29	258	15,860
April	29	0	8	476
May	19	0	3.9	240
June	217	6	27	1,607
July	750	9	65	2,828
August	696	.....	97	5,964
The period	.....	.....	.....	26,975
1906.				
April	39	0	10.9	649
May	1,330	0	159	9,780
June	10,900	1,100	4,150	247,000
July	2,000	39	399	24,500
August	39	12	22.8	1,400
September	412	19	63.4	3,770
October	129	19	31.6	1,940
November	87	69	73.5	4,370
The period	.....	.....	.....	293,000
1907.				
April	11,200	1,990	6,430	383,000
May	2,160	819	1,390	85,500
June	5,830	680	1,600	95,200
July	2,320	254	833	54,300
August	401	61	113	6,950
September	334	61	132	7,860
October	218	110	133	8,180
November	145	74	102	6,070
The period	.....	.....	.....	647,000
1908.				
April	762	100	354	21,100
May	410	34	134	8,240
June	6,410	401	2,220	132,000
July	899	160	310	19,100
August	165	80	115	7,070
September	150	94	118	7,020
October	266	104	194	11,900
November	470	186	292	17,400
The period	.....	.....	.....	224,000

Monthly discharge of Milk River at Malta, Mont., 1902–1917—Continued.

Month.	Discharge in second-feet.			Run-off (in acre-feet).
	Maximum.	Minimum.	Mean.	
1909.				
April	1,200	247	547	32,500
May	4,860	404	1,830	113,000
June	6,980	545	1,940	115,000
July	2,040	320	913	56,100
August	1,050	80	363	22,300
September	186	52	79.9	4,750
October	116	52	82.5	5,070
November	116	65	88.9	5,290
The period	.....	.....	.....	354,000
1910.				
April	570	34	166	9,880
May	116	29	50.2	3,090
June	116	1	24.8	1,480
July	2.5	0	.52	32
August	.....	.....	0	0
September	.....	.....	0	0
October	.....	.....	0	0
November	.....	.....	0	0
The period	.....	.....	.....	14,500
1911.				
March	758	129	246	15,100
April	346	51	131	7,800
May	1,280	44	384	23,600
June	725	15	183	10,900
July	1,540	26	319	19,600
August	216	16	85.3	5,240
September	6,860	31	1,730	103,000
October	630	257	392	24,100
November	199	.....	104	6,190
The period	.....	.....	.....	216,000
1912.				
April	9,320	1,280	5,540	330,000
May	3,060	540	1,230	75,600
June	1,620	238	719	42,800
July	780	135	257	15,800
August	405	135	211	13,000
September	255	110	145	8,630
October	255	190	210	12,900
November	255	135	206	12,300
The period	.....	.....	.....	511,000
1913.				
April 6–30	4,100	1,140	2,560	127,000
May	.....	.....	1,080	66,400
June	.....	.....	377	22,400
July	916	17	282	17,300
August	152	8	48.2	2,960
September	76	31	40.7	2,420
October	360	31	82.9	5,100
November	281	85	144	8,570
The period	.....	.....	.....	252,000
1914.				
March 23–31	988	382	583	10,400
April	814	36	447	26,600
May	43	10	18.1	1,110
June	506	11	95.2	5,660
July	281	21	55.1	3,390
August	29	11	15.9	978
September	21	8	12.2	726
October	847	16	209	12,900
November	225	52	118	7,020
December 1–7	80	64	70.3	976
The period	.....	.....	.....	69,800

Monthly discharge of Milk River at Malta, Mont., 1902–1917—Continued.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1915.				
March 22-31	4,410	385	3,260	64,700
April	5,860	40	1,560	92,800
May	187	23	57.8	3,550
June	1,280	85	509	30,300
July	1,480	235	580	35,700
August	1,280	123	350	21,500
September	385	130	238	14,200
October	307	195	246	15,100
November	225	120	155	9,220
December 1-18	127	106	119	4,250
The period	.....	.....	.....	291,000
1916.				
February 17-29	3,580	254	2,740	70,600
March	6,450	1,280	3,980	245,000
April	4,350	45	918	54,600
May	2,040	48	267	16,400
June	4,290	1,070	1,690	101,000
July	5,400	600	2,440	150,000
August	895	74	423	26,000
September	660	137	253	15,100
October	600	150	325	20,000
November	327	167	232	13,800
December 1-20	180	137	162	6,430
The period	.....	.....	.....	719,000
1917.				
April	10,100	2,860	6,410	381,000
May	3,920	1,280	2,280	140,000
June	1,410	104	812	48,300
July	104	55	71.5	4,400
August	164	48	72.4	4,450
September	220	64	84.7	5,040
October	725	112	206	12,700
November	272	141	208	12,400
The period	.....	.....	.....	608,000

NOTE.—Estimates of mean monthly discharge for the following periods as originally published have been discarded as based on insufficient data: Jan. 1 to Mar. 31, 1903 and 1904; Jan. 1 to Feb. 28, 1905; Jan. 1 to Mar. 31 and Dec. 1-31, 1910; Dec. 1-31, 1911.

Mean discharge for August, 1904, estimated. Discharge known to have been very small.

Mean monthly discharge, in second-feet, of Milk River at Malta, Mont., 1902–1917.

Year.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total in acre-feet.
1902	.....	.....	.....	.....	.....	.....	294	143	189	[a]178	.....	.....
1903	.....	.....	1,770	1,350	1,140	408	417	299	180	124	[b]91	345,000
1904	.....	.....	[c]3,570	565	552	17	1	0	0	14	15	212,000
1905	.....	258	8	3.9	27	65	97	0	0	0	0	27,000
1906	.....	.....	10.9	159	4,150	399	22.8	63.4	31.6	73.5	.....	293,000
1907	.....	.....	6,430	1,390	1,600	883	113	132	133	102	.....	647,000
1908	.....	.....	354	134	2,220	310	115	118	194	292	.....	224,000
1909	.....	.....	547	1,830	1,940	913	363	79.9	82.5	88.9	.....	354,000
1910	.....	.....	166	50.2	24.8	.52	0	0	0	0	.....	14,500
1911	.....	246	131	384	183	319	85.3	1,730	392	104	.....	216,000
1912	.....	.....	5,540	1,230	719	257	211	145	210	206	.....	511,000
1913	.....	.....	[d]2,560	1,080	377	282	48.2	40.7	82.9	144	.....	252,000
1914	.....	[e]583	447	18.1	95.2	55.1	15.9	12.2	209	118	[f]70.3	69,800
1915	.....	[g]3,260	1,560	57.8	509	580	350	238	246	155	[h]119	291,000
1916	[j]2,740	3,980	918	267	1,660	2,440	423	253	325	232	[k]162	719,000
1917	.....	.....	6,410	2,280	812	71.5	72.4	84.7	206	208	.....	608,000
Average	.....	.....	2,030	720	1,070	467	164	209	155	124	.....	319,000
Median	.....	.....	918	384	719	310	105	101	184	118	.....	291,000
Maximum	.....	.....	6,430	2,280	4,150	2,440	423	1,730	392	292	.....	719,000
Minimum	.....	.....	8	3.9	24.8	.5	0	0	0	0	.....	14,500

[a] Nov. 1-8. [b] Dec. 1-10. [c] Apr. 11-30. [d] Apr. 6-30. [e] Mar. 23-31. [f] Dec. 1-7. [g] Mar. 22-31. [h] Dec. 1-18. [j] Feb. 17-29. [k] Dec. 1-20.

NOTE.—Means for periods less than a full month but exceeding 15 days were considered means for the month in finding average and median flow. The median flow given was obtained by arranging the monthly means in their order of magnitude and taking the middle mean, or, if their number was even, the average of the two middle means. By using daily discharge a considerably lower median discharge would be obtained. The total yearly flow in acre-feet has been averaged because in general the period of record covers the open-water season, and the flow during months for which records are missing was usually small.

MILK RIVER AT HINSDALE, MONT.

LOCATION.—In the NE. ¼ SW. ¼ sec. 33, T. 31 N., R. 36 E., at highway bridge over Milk River about a mile from Hinsdale, a point 46 miles above junction of Milk River with the Missouri.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 13, 1908, to November 13, 1914. On account of backwater the station was moved to Vandalia dam, about 8 miles downstream, in 1915, the flow at this point being practically the same as at Hinsdale.

GAGE.—Chain fastened to upstream side of highway bridge.

CHANNEL AND CONTROL.—Bed of stream is gravel with a deposit of mud along the banks. Banks are high and are overflowed only during extreme floods. Water at the gage is deep and sluggish at low stages, due to a gravel bar 1 mile below, which forms the control.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

EXTREMES OF DISCHARGE.—1908–1914: Maximum stage recorded, April 6, 1912, discharge estimated at 24,200 second-feet; river reported dry August 9–13, 1910. (See hydrograph, Pl. XVIII.)

ICE.—Stream usually frozen entirely across and to a considerable depth from late in November until the first of April.

DIVERSIONS.—No water is diverted between station at Malta and that at Hinsdale. Above Malta numerous canals divert water from the main stream and nearly all the tributaries.

REGULATION.—Some return water from irrigation increases the low-water flow during summer months.

ACCURACY.—Stage-discharge relation permanent except during floods. Records good.

Discharge measurements of Milk River at Hinsdale, Mont., 1908–1914.

Date.	Made by—	Gage height.	Discharge.
1908.		*Feet.*	*Sec.-ft.*
May 14	Stewart and Huch	1.98	118
27	A. F. Huch	2.93	367
June 9	do	4.91	1,620
25	do	4.49	1,273
July 8	do	3.08	472
Aug. 10	do	2.11	163
Sept. 28	do	1.70	72
1909.			
Apr. 23	Stewart and Lamb	3.29	633
May 4	W. A. Lamb	4.80	1,540
5	do	4.58	1,440
11	do	7.10	3,410
20	do	4.05	1,050
21	do	4.05	1,060
21	do	4.35	1,220
June 5	do	4.76	1,470
24	do	13.25	8,090
July 2	do	8.23	4,090
22	do	3.72	836
Aug. 23	do	2.18	194
23	do	2.18	200
Sept. 18	do	1.75	77
1910.			
Mar. 28	Raymond Richards	6.57	2,830
Apr. 28	W. A. Lamb	2.08	158
May 18	M. E. McChristie	1.71	86
28	do	1.68	81
July 8	do	.89	9
25	do	.65	3.5
1911.			
Apr. 15	J. C. Beebe	3.48	775
20	do	2.92	480
May 17	J. C. Beebe	2.00	180
June 16	do	2.42	254
July 2	do	3.06	633
2	do	4.51	1,400
Oct. 9	W. A. Lamb	4.06	1,020
1912.			
Apr. 21	B. E. Jones	14.15	8,940
26	do	6.98	2,920
May 5	do	5.48	1,940
10	do	10.45	5,730
25	R. R. Randell	5.85	2,130
June 18	do	5.39	1,780
July 29	do	2.70	272
Aug. 31	do	3.45	627
Nov. 14	do	2.72	315
1913.			
Mar. 24	R. R. Randell	3.22	338
Apr. 23	J. B. Stewart	6.92	2,930
May 6	do	4.37	1,110
23	do	4.63	1,280
June 19	do	3.40	664
July 20	do	2.45	216
Aug. 1	do	1.73	92
Sept. 20	W. A. Lamb	1.35	30
1914.			
May 6	B. E. Jones	1.91	147
June 4	do	1.26	35
June 17	do	4.26	1,210
July 4	do	2.60	354
Oct. 28	do	2.07	199

NOTE.—1908: May 27 and July 8, gage height doubtful.
1910: July 25, discharge estimated.
1911: July 2, gage height 3.06; water began to rise during measurement and results are affected by hanging slope.
1913: Mar. 24, ice present.

Daily discharge, in second-feet, of Milk River at Hinsdale, Mont., 1908–1914.

Day.	May.	June.	July.	Aug.	Day.	May.	June.	July.	Aug.
1908.					1908.				
1	.....	135	885	122	16	122	5,010	278	41
2	.....	110	775	135	17	110	3,410	278	67
3	.....	110	725	135	18	110	2,770	242	125
4	.....	135	675	135	19	98	2,170	225	138
5	.....	165	625	148	20	85	2,100	225	125
6	.....	410	580	165	21	65	1,800	210	100
7	.....	725	535	135	22	65	1,660	195	77
8	.....	725	490	135	23	65	1,520	195	125
9	.....	1,520	490	135	24	65	1,380	180	168
10	.....	1,940	450	135	25	65	1,320	165	168
11	.....	2,770	410	125	26	295	1,180	135	183
12	.....	4,130	295	100	27	410	1,120	135	125
13	135	5,170	295	77	28	330	1,060	135	112
14	122	5,970	295	59	29	295	1,000	135	77
15	122	6,210	295	41	30	225	940	122	77
					31	195	.....	110	31

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1909.								
1	1,770	675	2,850	6,330	700	85	50	110
2	2,430	775	2,240	4,410	1,090	85	50	110
3	2,360	885	2,020	3,930	912	75	50	110
4	2,210	1,520	1,660	3,450	830	65	50	110
5	1,630	1,380	1,460	2,280	1,000	65	58	110
6	1,420	1,180	1,220	1,840	1,060	65	65	110
7	1,380	970	1,030	4,530	812	65	75	122
8	1,420	775	802	3,410	675	65	75	135
9	1,420	1,380	700	3,570	580	65	65	135
10	1,700	2,020	700	3,810	535	58	65	135
11	1,420	3,170	675	4,170	512	58	65	135
12	1,180	2,850	675	3,090	490	58	65	135
13	1,220	2,280	802	2,280	450	58	65	135
14	1,060	1,740	775	1,875	410	58	65	135
15	970	1,380	802	1,740	410	58	65	135
16	970	1,180	775	1,380	390	58	65	135
17	802	1,120	1,180	1,180	370	58	65	65
18	700	1,060	1,150	1,180	330	58	65	65
19	750	1,120	940	1,090	295	58	65	65
20	512	1,060	3,570	1,000	260	50	65	65
21	750	1,030	11,200	940	225	50	65	65
22	602	1,660	12,400	830	225	50	65	65
23	625	1,800	9,170	775	225	50	65	65
24	490	1,800	8,170	725	210	50	65	65
25	370	1,740	8,210	625	195	50	75	65
26	370	1,800	7,610	625	180	50	85	65
27	370	2,850	5,690	1,350	165	50	98	60
28	490	3,650	4,010	1,220	148	50	110	65
29	580	4,450	9,210	1,350	135	50	110	65
30	625	4,610	9,610	2,100	110	50	110	65
31	.....	3,450	.....	940	98	.....	110	.....

Daily discharge, in second-feet, of Milk River at Hinsdale, Mont., 1908–1914—Contd.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1910.									
1	.....	1,380	103	86	13	1.3	44	1.3	3.6
2	.....	1,180	103	103	13	1.3	26	1.3	3.6
3	.....	1,180	103	86	13	1.3	19	1.3	2.8
4	.....	1,490	103	86	13	1.3	19	.6	3.6
5	.....	1,180	103	103	13	.6	13	1.3	3.6
6	.....	1,090	103	103	13	1.3	6.5	1.3	3.6
7	.....	830	103	86	13	.6	4.5	1.3	2.8
8	.....	750	103	86	13	.6	5.5	1.3	2.8
9	.....	675	103	103	13	0	4.5	1.3	2.8
10	.....	535	86	103	9	0	4.5	2.0	2.8
11	.....	1,060	78	86	9	0	4.5	2.8	2.8
12	.....	775	70	70	6.5	0	3.6	2.8	2.8
13	.....	535	78	56	6.5	0	3.6	2.8	.....
14	.....	490	56	56	6.5	.6	2.8	2.0	.....
15	.....	370	56	56	6.5	.6	2.8	1.3	.....
16	.....	256	50	56	6.5	179	2.8	1.3	.....
17	.....	1,180	56	56	4.5	207	2.8	1.3	.....
18	.....	580	86	86	4.5	103	2.8	2.0	.....
19	.....	222	50	70	4.5	70	2.8	2.8	.....
20	.....	222	50	56	4.5	44	2.8	2.8	.....
21	.....	222	44	56	4.5	44	2.8	2.0	.....
22	.....	192	44	44	4.5	39	2.0	2.0	.....
23	.....	166	44	34	4.5	34	1.3	2.0	.....
24	.....	143	34	26	3.6	19	1.3	2.8	.....
25	.....	143	34	19	3.6	9	1.3	2.8	.....
26	.....	122	56	19	2.0	9	1.3	2.8	.....
27	.....	112	44	19	2.0	6.5	1.3	2.8	.....
28	2,850	166	86	13	2.0	7.7	2.0	2.8	.....
29	2,850	103	86	13	1.3	6.5	2.0	2.8	.....
30	2,100	86	86	56	2.0	6.5	1.3	2.8	.....
31	1,490	.....	86	.....	.6	5.5	.....	3.6	.....
1911.									
1	.....	825	315	1,020	355	177	63	2,170	330
2	.....	880	298	990	1,300	78	56	4,130	330
3	.....	640	395	640	1,430	32	56	4,850	312
4	.....	665	435	640	1,170	32	36	9,250	312
5	.....	742	435	640	1,170	32	4,090	5,090	295
6	.....	690	415	640	1,110	32	6,210	2,470	295
7	.....	715	395	640	990	24	13,700	1,940	276
8	.....	690	395	615	715	24	12,100	1,180	.....
9	.....	715	335	542	715	24	10,800	1,000	.....
10	.....	640	245	455	615	18	9,090	940	.....
11	.....	690	262	335	475	18	7,250	830	.....
12	.....	715	280	335	355	13	6,610	775	.....
13	.....	640	210	415	262	50	5,170	675	.....
14	.....	665	147	335	228	32	5,250	625	.....
15	.....	742	162	335	162	32	4,130	602	.....
16	.....	962	162	262	162	24	3,010	580	.....
17	.....	1,140	147	194	162	24	2,770	558	.....
18	.....	962	147	194	335	24	2,320	535	.....
19	.....	590	147	194	262	24	1,740	490	.....
20	.....	475	78	194	108	245	1,460	490	.....
21	498	475	78	194	36	147	1,320	450	.....
22	520	475	56	194	28	134	1,060	450	.....
23	852	520	97	220	36	134	830	450	.....
24	1,050	520	194	245	36	108	830	450	.....
25	852	498	194	2,850	36	88	775	450	.....
26	852	435	475	1,430	45	78	725	410	.....
27	1,050	395	665	665	36	70	580	410	.....
28	1,140	355	1,020	565	36	70	535	390	.....
29	1,170	335	2,400	455	36	56	625	370	.....
30	852	315	2,360	395	298	45	775	330	.....
31	880	.....	1,830	.....	262	78	.....	295	.....

Daily discharge, in second-feet, of Milk River at Hinsdale, Mont., 1908–1914—Contd.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1912.								
1	6,000	2,020	2,790	655	240	575	320	285
2	7,000	1,950	2,720	500	225	475	240	270
3	8,000	1,880	2,440	405	225	405	320	285
4	9,000	2,020	2,160	500	212	302	302	270
5	16,000	2,440	2,090	382	200	1,120	255	270
6	24,200	3,000	1,760	382	200	880	255	285
7	23,900	3,930	1,690	382	188	682	302	270
8	23,600	5,920	1,500	1,000	188	475	285	285
9	22,300	6,370	1,360	1,430	188	405	382	270
10	21,000	5,560	1,300	1,360	188	360	270	270
11	20,900	3,490	1,300	1,300	188	360	285	285
12	20,600	3,420	3,070	1,180	188	340	240	270
13	20,300	3,070	3,140	1,000	188	320	255	285
14	20,000	2,650	3,000	1,060	190	255	240	240
15	19,700	2,440	2,650	765	190	225	240	302
16	19,400	2,020	2,230	600	190	212	255	302
17	19,100	1,820	1,760	500	190	188	302	.....
18	18,800	1,820	1,820	500	190	200	285	.....
19	14,600	1,690	1,560	450	200	200	240	.....
20	10,400	1,690	1,300	450	3,000	188	240	.....
21	9,000	1,500	1,240	405	3,700	200	255	.....
22	7,480	1,430	1,180	405	3,500	188	240	.....
23	5,470	1,430	1,120	405	3,000	200	320	.....
24	4,480	2,580	1,120	382	2,500	188	270	.....
25	3,780	2,160	1,120	360	2,000	200	270	.....
26	2,930	2,090	1,060	450	1,500	200	285	.....
27	2,440	2,090	1,060	382	1,000	188	270	.....
28	2,440	7,760	820	320	1,000	200	285	.....
29	2,370	10,000	710	285	1,000	200	270	.....
30	2,230	6,010	600	285	655	188	270	.....
31	.....	3,490	.....	255	628	.....	285	.....
1913.								
1	.....	1,430	880	770	86	122	40	.....
2	.....	1,300	720	880	78	106	40	.....
3	.....	1,240	820	720	70	90	35	.....
4	7,380	1,240	720	770	62	90	40	.....
5	6,820	1,180	570	975	69	75	40	.....
6	6,370	1,180	520	1,180	56	75	40	.....
7	5,920	1,180	520	1,060	62	75	40	140
8	4,720	1,120	475	1,000	66	59	40	120
9	3,930	940	430	1,000	68	59	40	120
10	3,210	820	390	.....	68	49	50	120
11	2,930	940	390	.....	68	49	50	120
12	2,930	880	498	.....	68	49	50	120
13	2,930	820	475	.....	68	48	50	105
14	2,930	940	475	.....	66	48	60	105
15	2,930	940	430	.....	66	38	75	.....
16	2,930	1,060	430	.....	128	38	75	.....
17	3,930	1,000	570	.....	128	38	60	.....
18	4,320	1,000	520	.....	111	37	50	.....
19	4,360	2,230	1,000	.....	94	27	50	.....
20	4,400	3,490	1,560	225	80	30	60	.....
21	3,930	3,490	1,300	208	80	30	60	.....
22	3,420	1,430	940	208	80	20	75	.....
23	2,230	1,300	1,120	182	80	20	90	.....
24	2,580	1,240	1,000	158	78	30	90	.....
25	2,300	1,180	940	118	78	30	.....	.....
26	2,160	1,180	820	117	70	30	.....	.....
27	2,020	1,180	720	117	70	30	.....	.....
28	1,880	1,180	620	422	63	30	.....	.....
29	1,760	1,180	620	117	213	30	.....	.....
30	1,560	1,180	620	102	110	35	.....	.....
31	.....	1,060	.....	93	142	.....	.....	.....

Daily discharge, in second-feet, of Milk River at Hinsdale, Mont., 1908–1914—Contd.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1914.								
1	.....	288	40	337	20	48	28	283
2	.....	227	40	328	24	48	28	257
3	.....	186	34	320	20	48	28	199
4	1,690	173	34	354	20	40	28	227
5	1,390	138	34	304	17	28	28	199
6	1,030	161	34	304	17	24	28	199
7	1,210	138	34	288	17	24	800	199
8	1,270	118	40	242	12	24	2,140	149
9	1,150	109	28	213	14	28	1,420	173
10	942	109	34	161	12	20	668	161
11	888	109	24	149	13	19	372	149
12	915	100	28	503	14	18	272	149
13	1,090	91	722	272	12	17	186	128
14	1,270	91	3,630	199	14	20	372	.....
15	1,210	91	2,010	138	24	186	750	.....
16	1,150	91	778	100	24	118	615	.....
17	1,030	91	1,090	91	28	173	503	.....
18	970	91	1,390	82	24	109	444	.....
19	1,030	91	1,330	82	34	91	407	.....
20	832	82	1.210	64	100	82	389	.....
21	590	82	860	48	48	64	337	.....
22	915	82	590	40	970	56	304	.....
23	778	64	463	40	213	40	272	.....
24	750	73	368	40	1,150	40	242	.....
25	524	56	272	28	2,790	34	199	.....
26	463	56	257	24	483	34	227	.....
27	435	48	425	28	304	34	199	.....
28	407	34	483	20	138	34	186	.....
29	389	40	425	24	110	34	288	.....
30	337	40	389	20	82	34	288	.....
31	.....	40	.....	20	64	.....	288	.....

NOTE.—1908: Sept. 1 to Nov. 18, daily discharge as originally published believed to be in error due to errors in gage readings; as it is impossible to determine the correction to gage readings for this period, the record has been omitted from the compilation.

1910: Nov. 13–30, mean discharge estimated 2.5 second-feet.

1911: Mar. 1–20, mean discharge estimated 300 second-feet.

1912: daily discharge Apr. 5–17, estimated from the high-water mark which was referred to gage datum by leveling; also from a current meter measurement at Vandalia, 6 miles below Hinsdale, on Apr. 10, the date of the highest water having been observed by the hydrographer. Aug. 9–12, 14–20, and 22–29, discharge estimated. Mean discharge Nov. 17–30, estimated at 250 second-feet.

1913: July 10–19, discharge estimated at 380 second-feet.

1914: Apr. 1–3, discharge estimated at 1,100 second-feet; May 30 to June 6, discharge interpolated.

Monthly discharge of Milk River at Hinsdale, Mont., 1908–1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1908.				
May 13–31	410	65	157	5,920
June	6,210	110	1,960	117,000
July	885	110	348	21,400
August	183	31	114	7,010
The period	.....	.....	.....	151,000
1909.				
April	2,430	370	1,090	64,900
May	4,610	675	1,850	114,000
June	12,400	675	3,710	221,000
July	6,330	625	2,190	135,000
August	1,090	98	452	27,800
September	85	50	58.8	3,500
October	110	50	71.3	4,380
November	135	65	96.9	5,770
The period	.....	.....	.....	576,000

A. VANDALIA DAM OF THE UNITED STATES RECLAMATION SERVICE, VANDALIA, MONT. POOL ABOVE DAM.

B. VANDALIA DAM OF THE UNITED STATES RECLAMATION SERVICE, VANDALIA, MONT. CREST GATES—TWO CLOSED, ONE OPEN.

Monthly discharge of Milk River at Hinsdale, Mont., 1908–1914—Continued.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1910.				
April	1,380	86	581	34,600
May	103	34	73.8	4,540
June	103	13	63.1	3,750
July	13	.6	6.97	429
August	207	0	25.8	1,590
September	44	1.3	6.48	386
October	3.6	.6	2.07	127
November	3.6	.....	2.76	164
The period	.....	.....	.....	45,600
1911.				
March	.....	.....	507	31,200
April	1,140	315	637	37,900
May	2,400	56	477	29,300
June	2,850	194	561	33,400
July	1,430	28	418	25,700
August	245	13	63.5	3,900
September	13,700	36	3,470	206,000
October	9,250	295	1,410	86,700
November	.....	.....	187	11,100
The period	.....	.....	.....	454,000
1912.				
April	24,200	2,230	12,900	768,000
May	10,000	1,430	3,220	198,000
June	3,140	600	1,720	102,000
July	1,430	255	604	37,100
August	3,700	188	879	54,000
September	1,120	188	337	20,100
October	382	240	275	16,900
November	.....	.....	265	15,800
The period	.....	.....	.....	1,210,000
1913.				
April 4–30	7,380	1,560	3,580	192,000
May	3,490	820	1,310	80,600
June	1,560	390	703	41,800
July	1,180	93	459	28,200
August	213	56	84.7	5,210
September	122	20	49.6	2,950
October 1–24	90	35	54.2	2,580
The period	.....	.....	.....	353,000
1914.				
April	1,690	337	932	55,500
May	288	34	103	6,330
June	3,630	24	570	33,900
July	503	20	157	9,650
August	2,790	12	220	13,500
September	186	17	52.3	3,110
October	2,140	28	398	24,500
November 1–13	288	128	191	4,920
The period	.....	.....	.....	151,410

MILK RIVER NEAR VANDALIA, MONT.

LOCATION.—In sec. 7, T. 30 N., R. 37 E., at Vandalia dam of United States Reclamation Service, 2 miles west of Vandalia in Valley County. (See Pl. XIX.)

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 5, 1915, to December 31, 1917. Station maintained at Hinsdale, 8 miles upstream, from May 13, 1908, to November 13, 1914. Discharge nearly same at both points.

GAGE.—Sloping gage painted on concrete of right abutment downstream side of dam. Read twice daily to tenths by employees of United States Reclamation Service. It is difficult to read gage closer than the nearest tenth as water coming through sluice gate and over dam causes waves at gage.

DISCHARGE MEASUREMENTS.—Made from the bridge over crest of dam, from highway bridge at Vandalia about 2 miles downstream, or by wading.

CHANNEL AND CONTROL.—Water surface at gage in large pool below dam is controlled by gravel bar at medium and low stages. This bar is drowned out at high stages. Both banks high; left is overflowed at high stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 34.5 feet April 11, 1917 (discharge, 25,200 second-feet); channel reported dry August 9–13, 1910. (See hydrograph, Pl. XX.)

ICE.—Stage-discharge relation affected by ice during winter season except for periods of high water. The flow during the winter is fairly constant and can be estimated from the flow at Malta or from a few discharge measurements and daily gage heights.

DIVERSIONS.—Numerous canals divert water for irrigation from main stream and nearly all tributaries.

REGULATION.—Flow partly regulated by the diversion dam at station and by storage in Nelson reservoir.

ACCURACY.—Stage-discharge relation not permanent; seriously affected by ice and by shifting control. Daily gage heights are mean of two readings daily to nearest tenth. Readings on the gage are difficult to make when gates are open and when flow over crest is large; this condition may introduce errors. An automatic crest on the dam keeps the water level above the dam fairly constant. It takes an appreciable change in water surface above the dam to overcome the inertia in these gates and so raise or lower them. As a result at low stages they tend to remain fixed and so give a fairly constant discharge below. Gage heights subject to error at medium and high stages when flow over crest of dam or through sluice gates causes wave action on gage.

Discharge measurements of Milk River near Vandalia, Mont., 1915–1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
Apr. 9	B. E. Jones	.....	4,290	June 20	A. H. Tuttle	8.60	1,770
May 5	do	2.35	.4	July 25	do	7.80	1,440
6	do	2.81	6.0	Aug. 21	do	5.60	437
17	do	4.50	201	Oct. 7	do	4.75	176
29	do	7.90	1,500	Dec. 21	W. A. Lamb	4.45	114
June 25	do	5.65	632				
July 30	do	6.40	843	1917.			
Aug. 21	W. A. Lamb	4.75	318	Jan. 27	Tuttle and Freegans	4.40	83
Nov. 21	do	4.30	154	Apr. 3	Anderson and Tuttle	18.0	4,460
				19	M. D. Anderson	28.7	17,400
1916.				May 15	A. H. Tuttle	15.6	4,920
Mar. 18	do	.....	422	30	do	9.1	1,810
Apr. 12	A. H. Tuttle	21.0	8,320	June 13	do	6.70	909
30	do	5.95	668	Aug. 7	do	4.30	77
May 18	do	4.80	267	Nov. 15	Jones and Lamb	4.50	196

NOTE.—1915: Apr. 9, measurement made at Hinsdale bridge. Gage at dam not yet installed. Depth of water on crest of Vandalia dam 2.20 feet. May 5, discharge estimated. Measurements May 29 to Aug. 21, made from bridge 4 miles below the gage.

1916: Mar. 18, ice measurement; gage submerged by ice jam. Oct. 1, measurements made from highway bridge at Vandalia. Dec. 31, stage-discharge relation affected by ice.

1917: Apr. 3 and 19, May 15 and 30, measurements made from bridge over dam; June 13, measurement made from highway bridge at Vandalia. Stage-discharge relation affected by ice Jan. 27 and Apr. 3.

Daily discharge, in second-feet, of Milk River near Vandalia, Mont., 1915–1917.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1915.												
1	.....	.....	.....	.....	.....	496	568	716	428	267	428	145
2	.....	.....	.....	.....	.....	428	496	716	297	253	428	145
3	.....	.....	.....	.....	.....	870	395	496	267	253	362	147
4	.....	.....	.....	.....	.....	950	362	496	297	297	297	147
5	.....	.....	.....	.....	0.4	716	239	568	282	297	297	147
6	.....	.....	.....	.....	1.0	604	395	640	239	267	297	147
7	.....	.....	.....	.....	5.8	568	462	568	147	213	267	147
8	.....	.....	.....	.....	6.9	532	462	568	147	213	297	147
9	.....	.....	.....	.....	6.9	462	568	532	114	253	297	147
10	.....	.....	.....	.....	8.0	462	532	496	114	239	239	147
11	.....	.....	.....	.....	81	496	462	496	129	267	213	147
12	.....	.....	.....	.....	147	640	395	329	297	239	189	147
13	.....	.....	.....	.....	129	1,030	428	239	213	213	189	147
14	.....	.....	.....	.....	129	1,330	1,080	239	213	253	189	147
15	.....	.....	.....	.....	167	1,030	1,550	213	213	267	189	147
16	.....	.....	.....	.....	213	870	2,130	189	395	346	189	147
17	.....	.....	.....	.....	213	754	2,010	147	329	428	189	147
18	.....	.....	.....	.....	213	568	3,340	496	329	395	189	147
19	.....	.....	.....	.....	213	532	4,940	950	297	395	157	147
20	.....	.....	.....	.....	213	568	4,440	428	267	395	155	147
21	.....	.....	.....	.....	213	640	2,770	297	329	428	154	147
22	.....	.....	.....	.....	213	716	2,010	267	362	428	145	147
23	.....	.....	.....	.....	213	678	2,250	167	297	532	145	147
24	.....	.....	.....	.....	213	428	2,250	87	313	532	145	147
25	.....	.....	.....	.....	226	496	1,660	114	313	496	145	147
26	.....	.....	.....	.....	3,050	1,200	1,440	75	267	496	145	147
27	.....	.....	.....	.....	7,920	1,370	1,120	678	282	532	145	147
28	.....	.....	.....	.....	3,050	870	1,290	792	313	496	145	147
29	.....	.....	.....	.....	1,550	754	1,440	604	282	496	145	147
30	.....	.....	.....	.....	1,110	640	960	329	297	496	145	147
31	.....	.....	.....	.....	568	.....	716	496	.....	462	.....	147
1916.												
1	147	114	.....	.....	272	2,430	7,390	1,820	269	144	398	188
2	147	114	.....	.....	330	2,430	8,090	1,290	300	144	300	188
3	147	114	.....	.....	460	2,430	7,450	1,040	300	165	300	213
4	147	114	.....	.....	495	2,430	5,960	994	300	176	300	240
5	147	114	.....	.....	495	3,020	5,300	716	240	165	300	213
6	147	114	.....	9,020	495	3,020	6,070	606	240	188	300	240
7	147	114	.....	7,920	495	2,820	7,220	606	240	188	300	213
8	147	114	.....	6,870	495	2,480	8,260	570	213	213	300	200
9	147	114	.....	5,630	460	2,190	8,840	500	213	213	300	200
10	147	114	.....	5,090	460	1,950	7,800	500	226	240	300	176
11	147	114	.....	6,520	393	1,950	6,760	500	365	240	300	176
12	147	114	.....	8,500	300	1,720	5,630	500	432	300	300	188
13	147	114	.....	9,080	300	1,500	4,770	432	432	365	240	188
14	147	114	.....	10,400	216	1,500	4,250	432	500	432	240	188
15	147	114	.....	8,030	216	1,500	3,520	535	432	870	240	188
16	129	114	.....	5,960	32	1,630	2,720	570	398	570	240	188
17	129	114	.....	5,090	32	1,630	2,330	570	365	500	240	144
18	129	114	422	4,040	203	1,680	2,870	466	332	535	240	144
19	129	114	.....	2,970	190	1,680	1,330	432	332	678	240	144
20	114	114	.....	2,290	203	1,720	836	432	300	754	188	144
21	114	114	.....	1,950	203	1,860	1,370	432	269	754	188	114
22	114	114	.....	1,630	190	1,860	1,680	398	240	754	188	114
23	114	.....	.....	1,460	165	1,770	1,860	398	240	754	188	114
24	114	.....	.....	1,420	216	1,680	1,770	365	226	716	188	114
25	114	.....	.....	1,250	272	1,590	1,420	332	200	716	188	114
26	114	.....	.....	797	1,590	1,680	1,250	300	188	716	188	114
27	114	.....	.....	603	1,590	1,720	996	240	188	642	188	114
28	114	.....	.....	460	996	2,050	530	213	200	570	188	114
29	114	.....	.....	330	955	2,820	915	165	240	570	188	114
30	114	.....	.....	460	875	4,720	2,050	144	144	570	188	114
31	114	.....	.....	.....	2,000	.....	2,140	200	.....	398	.....	114

Daily discharge, in second-feet, of Milk River near Vandalia, Mont., 1915–1917— Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1917.											
1	.....	.....	.....	400	6,950	1,640	116	77	40	108	196
2	.....	.....	.....	1,800	6,510	1,730	165	92	32	108	196
3	.....	.....	.....	4,460	6,160	1,640	165	92	32	70	196
4	.....	.....	.....	5,500	5,620	1,600	108	92	32	496	196
5	.....	.....	.....	6,250	5,000	1,690	108	92	32	287	196
6	.....	.....	.....	8,300	4,260	1,730	108	92	32	75	196
7	.....	.....	.....	11,500	3,850	1,730	144	77	32	30	196
8	.....	.....	.....	18,000	3,600	1,640	125	77	32	30	196
9	.....	.....	.....	21,000	3,200	1,600	108	77	32	30	216
10	.....	.....	.....	23,700	3,800	1,560	125	77	32	30	216
11	.....	.....	.....	25,100	3,150	1,210	108	77	32	30	216
12	.....	.....	.....	24,500	4,000	830	108	77	32	300	262
13	.....	.....	.....	23,700	4,100	830	92	63	32	339	274
14	.....	.....	.....	22,800	4,590	952	92	50	32	59	262
15	.....	.....	.....	21,700	5,120	952	77	50	36	75	216
16	.....	.....	.....	20,600	5,760	952	77	50	40	75	196
17	.....	.....	.....	19,500	5,820	952	165	50	40	75	196
18	.....	.....	.....	18,200	5,820	952	165	50	36	91	196
19	.....	.....	.....	17,300	5,620	952	144	50	92	100	216
20	.....	.....	.....	16,600	4,940	1,040	134	63	144	108	250
21	.....	.....	.....	15,900	4,100	1,510	108	63	144	125	287
22	.....	.....	.....	14,400	3,850	1,380	108	63	144	142	238
23	.....	.....	.....	11,000	3,550	1,040	92	63	125	160	196
24	.....	.....	.....	8,200	3,150	910	92	63	125	216	196
25	.....	.....	.....	7,800	2,790	716	77	63	108	378	196
26	.....	.....	.....	7,880	2,520	754	77	50	108	391	196
27	83	.....	.....	8,460	2,350	432	77	50	108	365	187
28	.....	.....	.....	8,620	2,170	108	77	50	108	352	196
29	.....	.....	.....	8,370	2,040	108	77	40	108	250	238
30	.....	.....	.....	8,040	1,860	108	77	40	108	178	206
31	.....	.....	.....	.....	1,600	.....	77	40	.....	178	.....

NOTE.—1915: Discharge May 6, estimated; sluice gate was opened to allow a larger discharge for current-meter measurement on this date, and was then closed. Flashboards put on dam Aug. 24. Daily discharge estimated Nov. 20 to Dec. 2, on account of ice.

1916: Discharge Feb. 23 to Apr. 5 not computed because stage-discharge relation was affected by backwater from ice, brush, and trees. Dec. 21–31, stage-discharge relation affected by ice; mean discharge estimated 114 second-feet.

1917: Apr. 1–9, daily discharge estimated from discharge measurement Apr. 3.

Monthly discharge of Milk River near Vandalia, Mont., 1915–1917.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1915.				
May 5–31	7,920	0.4	744	39,800
June	1,370	428	723	43,000
July	4,940	239	1,390	85,500
August	950	75	433	26,600
September	428	114	269	16,000
October	532	213	359	22,100
November	428	145	217	12,900
December	147	145	147	9,040
The period	.....	.....	.....	255,000
1916.				
January	147	114	132	8,120
February 1–22	114	114	114	4,970
April 6–30	10,400	330	4,310	214,000
May	2,000	32	503	30,900
June	4,720	1,500	2,120	126,000
July	8,840	530	3,980	245,000
August	1,820	144	539	33,100
September	500	144	285	17,000
October	870	144	459	28,200
November	398	188	248	14,800
December	240	114	162	9,960
The period	.....	.....	.....	732,000

Monthly discharge of Milk River near Vandalia, Mont., 1915–1917—Contd.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1917.				
April	25,100	400	13,700	815,000
May	6,950	1,600	4,120	253,000
June	1,730	108	1,110	66,000
July	165	77	109	6,700
August	92	40	64.8	3,980
September	144	32	67.7	4,030
October	496	30	170	10,500
November	287	187	214	12,700
The period	.....	.....	.....	1,172,000

Mean monthly discharge, in second-feet, of Milk River near Hinsdale and Vandalia, Mont., 1908–1917.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total in acre-feet.
1908	.....	.....	.....	.....	[a] 157	1,960	348	114	.....	.....	.....	.....	.....
1909	.....	.....	.....	1,090	1,850	3,710	2,190	452	58.8	71.3	96.9	.....	576,000
1910	.....	.....	.....	581	73.8	63.1	6.97	25.8	6.48	2.07	2.76	.....	45,600
1911	.....	.....	507	637	477	561	418	63.5	3,470	1,410	187	.....	454,000
1912	.....	.....	.....	12,900	3,220	1,720	604	879	337	275	265	.....	1,210,000
1913	.....	.....	.....	[b]3,580	1,310	703	459	84.7	49.6	[c] 54.2	.....	.....	353,000
1914	.....	.....	.....	932	103	570	157	220	52.3	398	[d]191	.....	151,000
1915	.....	.....	.....	.....	[e] 744	723	1,390	433	269	359	217	147	255,000
1916	132	[f]114	.....	[g]4,310	503	2,120	3,980	539	285	459	248	162	732,000
1917	.....	.....	.....	13,700	4,120	1,110	109	64.8	67.7	170	214	.....	1,170,000
Average	.....	.....	.....	4,720	1,260	1,320	966	288	511	355	176	.....	550,000
Median	.....	.....	.....	2,340	624	916	438	167	67.7	275	214	.....	454,000
Maximum	.....	.....	.....	13,700	4,120	3,710	3,980	879	3,470	1,410	265	.....	1,210,000
Minimum	.....	.....	.....	581	73.8	63.1	6.97	25.8	6.48	2.07	2.76	.....	45,600

NOTE.—Records were obtained at Hinsdale, 1908–1914, and at Vandalia dam, 1915–1917.

[a] May 13–31. [c] Oct. 1–24. [e] May 5–31. [g] Apr. 6–30.
[b] Apr. 4–30. [d] Nov. 1–13. [f] Feb. 1–22.

NOTE.—Means for periods less than a full month but exceeding 15 days were considered means for the month in finding average and median flow. The median flow given was obtained by arranging the monthly means in their order of magnitude and taking the middle mean, or, if their number was even, the average of the two middle means. By using daily discharge a considerably lower median discharge would be obtained. The total yearly flow in acre-feet has been averaged, because in general the period of record covers the open-water season, and the flow during months for which records are missing was usually small.

STATIONS ON TRIBUTARIES.

NORTH FORK OF MILK RIVER NEAR BROWNING, MONT.

LOCATION.—In sec. 16, T. 37 N., R. 11 W., at Alexander Dubray's ranch, 35 miles north of Browning and about 2 miles south of the Canadian boundary line, on the Blackfeet Indian Reservation in Teton County.

RECORDS AVAILABLE.—May 8, 1911, to July 6, 1912.

DRAINAGE AREA.—Not measured.

GAGE.—Staff gage nailed to a post on right bank.

CHANNEL AND CONTROL.—Bed of steam composed of small gravel. Control is a wide gravel bar, and is likely to shift at medium and high stages. Banks low; subject to overflow during floods.

DISCHARGE MEASUREMENTS.—Made by wading at convenient sections near the gage.

ICE.—Stream freezes over during the winter; winter gage heights have no value.

ACCURACY.—Stage-discharge relation not permanent. Discharge measurements cover only a small range in stage. Hydrographic comparison with records obtained at the Canadian station at Peter's ranch for 1911 and 1912 indicates (1) that the observer at Dubray's ranch, reading to tenths only, does not record small changes in stage, (2) that the flow at Dubray's ranch is consistently lower than at Peter's ranch by a considerable amount, and (3) that the records for August and September, 1911, are of doubtful accuracy, owing to questionable gage readings. Records fair.

Discharge measurements of North Fork of Milk River near Browning, Mont., 1911–12.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1911.		*Feet.*	*Sec.-ft.*	1911.		*Feet.*	*Sec.-ft.*
May 8	B. E. Jones	4.93	31	Aug. 28	B. E. Jones	4.74	20
9	do	4.97	34				
June 8	do	4.87	30	1912.			
25	W. A. Lamb	5.12	54	June 8	R. R. Randell	4.51	25

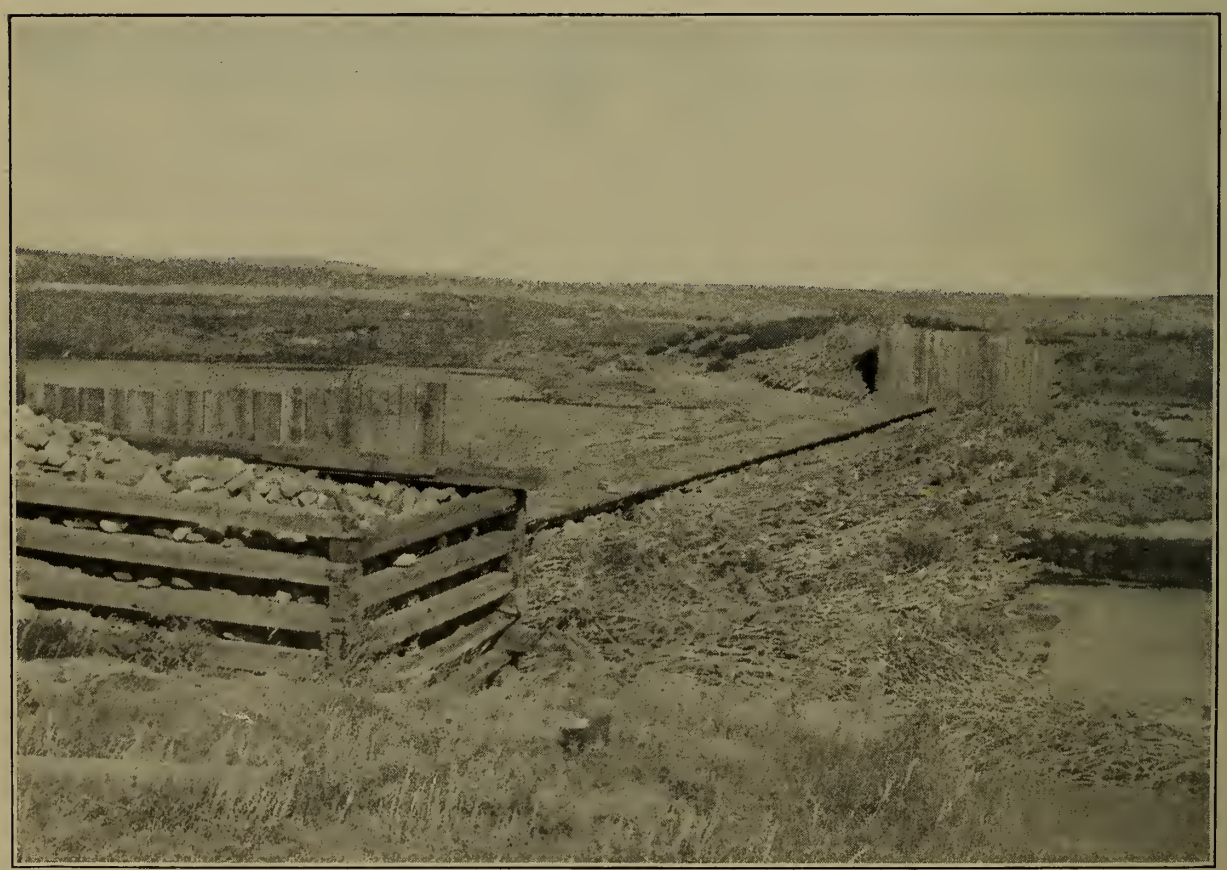
Daily discharge, in second-feet, of North Fork of Milk River near Browning, Mont., 1911–12.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1911.															
1	.....	42	42	29	6	33	33	16	81	25	12	12	33	33	.....
2	.....	38	33	29	9	33	33	17	42	25	18	12	33	33	.....
3	.....	38	33	29	52	33	33	18	52	25	22	12	33	33	.....
4	.....	33	33	29	95	33	33	19	42	25	22	9	33	33	.....
5	.....	33	29	36	347	33	33	20	38	25	25	9	33	33	.....
6	.....	38	29	33	347	33	33	21	38	25	25	9	52	33	.....
7	.....	33	18	38	338	33	33	22	38	29	25	6	52	33	.....
8	32	29	18	38	329	33	.....	23	42	42	22	6	33	33	.....
9	36	38	18	42	149	33	.....	24	42	52	22	6	33	33	.....
10	30	25	18	38	141	33	.....	25	47	52	18	9	33	33	.....
11	28	25	18	29	125	33	.....	26	47	58	18	9	33	33	.....
12	32	25	15	18	33	33	.....	27	42	58	15	6	33	33	.....
13	36	29	15	18	33	33	.....	28	38	52	15	15	33	33	.....
14	46	25	12	18	33	33	.....	29	33	47	18	9	33	33	.....
15	217	25	12	15	33	33	.....	30	33	47	38	6	33	33	.....
								31	38	.....	29	6	.....	33	.....

Day.	April.	May.	June.	July.	Day.	April.	May.	June.	July.
1912.					1912.				
1	195	41	32	32	16	41	32	28	.....
2	186	41	32	32	17	41	32	24	.....
3	168	41	32	32	18	46	32	24	.....
4	168	41	32	32	19	46	32	24	.....
5	142	41	32	24	20	41	56	21	.....
6	150	41	32	21	21	41	118	18	.....
7	126	41	28	.....	22	41	56	18	.....
8	110	41	24	.....	23	41	41	18	.....
9	102	41	24	.....	24	41	41	18	.....
10	95	41	24	.....	25	41	36	18	.....
11	81	41	24	.....	26	41	32	18	.....
12	68	41	24	.....	27	41	32	21	.....
13	51	41	24	.....	28	41	32	24	.....
14	46	41	24	.....	29	41	32	24	.....
15	41	36	28	.....	30	41	32	32	.....
					31	.....	32	.....	.....

NOTE.—Accuracy of record Aug. 15 to Sept. 2, 1911, doubtful on account of reading of gage by a new man in observer's absence.

A. INTERNATIONAL GAGING STATION ON NORTH FORK OF MILK RIVER NEAR INTERNATIONAL BOUNDARY.



B. NORTH CHINOOK IRRIGATION CO.'S DAM ON LODGE CREEK NEAR CHINOOK, MONT.

Monthly discharge of North Fork of Milk River at Browning, Mont., 1911–12.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1911.				
May 8–31	217	28	47.9	2,280
June	58	25	35.4	2,110
July	42	12	22.2	1,360
August	42	6	18.7	1,150
September	347	6	86.8	5,160
October	33	33	33.0	2,030
November 1–7	33	33	33.0	458
The period				14,500
1912.				
April	195	41	78.5	4,670
May	118	32	41.2	2,530
June	32	18	24.9	1,480
July 1–6	32	21	28.8	343
The period				9,020

NORTH FORK OF MILK RIVER NEAR INTERNATIONAL BOUNDARY.[1]

LOCATION.—In the NE. ¼ sec. 11, T. 1, R. 23 W. fourth meridian, about 15 miles (by road) southeast of Kimball, Alta., 5 miles below spillway of the United States Reclamation Service St. Mary canal, and about 2 miles north of the international boundary. (See Pl. XXI.)

DRAINAGE AREA.—101 square miles (measured on topographic maps).

RECORDS AVAILABLE.—July 21, 1909, to December 31, 1917. From July 21, 1909, to December 31, 1912, the station was about 2 miles farther downstream, in the NE. ¼ sec. 13, T. 1, R. 23 W. fourth meridian, and was maintained by the Reclamation Service, Department of the Interior, Canada.

GAGE.—Stevens water-stage recorder on left bank, 1913–1917; vertical staff used 1909 to 1912 and for winter readings to 1916; chain gage installed in September, 1916, was used for winter readings and as a check on water-stage recorder. Observer, Charles Barnett.

DISCHARGE MEASUREMENTS.—Made by wading, from footbridge 700 feet below gage, or from cable 800 feet below gage.

CHANNEL AND CONTROL.—Bed of stream at gage and principal control formed of clay and small boulders; slightly shifting. Banks low and subject to overflow at flood stages. Control likely to shift during high water.

EXTREMES OF DISCHARGE.—1909–1917: Maximum stage recorded, 4.86 feet June 23, 1911 (discharge, 555 second-feet); a stage of 3.9 feet July 27, 28, 1909, gave a discharge of 591 second-feet; minimum stage recorded, 1.97 feet December 7, 1915; minimum discharge recorded, 5 second-feet February 12, 1916 (stage, 3.45 feet).

ICE.—Stage-discharge relation affected by ice.

DIVERSIONS.—None.

REGULATION.—During July, August, and September, 1917, the flow was very largely regulated by the quantity of water turned into this stream from the United States Reclamation Service St. Mary canal. This condition will continue, as it is expected that the canal will be permanently in use.

ACCURACY.—Stage-discharge relation fairly permanent up to 1916; during 1916 and 1917 changed during high stages and by water from the United States Reclamation Service St. Mary canal. Open-water discharge computed by applying mean daily gage height to rating table and applying corrections for periods of shifting control; winter discharge determined from hydrographs based on discharge measurements, records of maximum and minimum temperature, and gage-height graphs. Records fair.

COOPERATION.—Station maintained jointly by the United States Geological Survey and the Reclamation Service, Department of the Interior, Canada.

[1] Station formerly called "North Fork of Milk River near Kimball, Alta.," in reports published by the United States Government and "North Branch of Milk River at Peters' ranch" in Canadian reports.

Discharge measurements of North Fork of Milk River near international boundary, 1910–1917.

Date.	Made by—	Gage height.	Discharge.
1910.		*Feet.*	*Sec.-ft.*
Apr. 9	L. J. Gleason	1.79	40.8
13	do	1.79	46.1
21	do	1.69	40.9
26	do	1.70	30.9
May 5	do	1.66	35.6
11	do	2.00	53.3
20	do	2.03	59.2
24	do	1.68	31.3
June 3	do	1.76	31.0
8	do	2.21	66.1
16	do	1.80	25.2
21	do	1.67	29.5
30	do	1.71	25.9
July 6	do	1.65	23.1
23	F. H. Peters	1.51	20.0
29	do	1.51	20.4
Aug. 5	do	1.51	19.4
11	do	1.47	18.4
Sept. 2	N. M. Sutherland	1.60	27.7
10	do	1.58	26.3
18	do	1.49	22.0
23	do	1.58	26.4
30	do	1.50	23.6
Oct. 11	do	1.47	20.7
23	do	1.44	21.0
27	do	1.72	17.5
Nov. 5	do	1.68	34.3
12	do	1.45	19.7
1911.			
Apr. 20	L. J. Gleeson	1.76	43.5
May 3	do	1.74	42.0
13	do	1.94	61.3
June 6	do	1.69	36.0
8	do	1.72	37.8
23	do	1.58	22.2
25	do	3.59	217.1
July 15	do	1.61	17.8
18	do	1.80	32.3
Aug. 9	do	2.09	49.0
15	do	1.59	24.0
Sept. 1	do	1.61	25.6
4	do	3.21	143.6
25	do	1.91	38.8
Oct. 6	do	1.91	35.0
1912.			
Apr. 24	L. J. Gleeson	1.92	43.60
May 8	do	1.91	49.10
10	do	1.91	53.10
31	do	1.85	34.90
June 2	do	1.82	32.50
21	do	1.83	22.90
July 2	G. F. Deas	2.22	51.90
18	V. Meek	2.09	28.50
19	do	2.08	25.32
Aug. 7	do	1.99	23.80
26	do	1.93	22.00
28	do	1.89	21.25
Sept. 18	do	1.83	22.24
20	do	2.02	29.10
Oct. 21	G. F. Deas	1.90	22.60
28	V. Meek	1.89	24.80
30	do	2.20	20.50
Nov. 19	do	1.94	28.60
Dec. 3	do	2.04	24.00
1913.			
May 2	F. R. Burfield	2.05	49.2
20	W. A. Lamb	2.32	82.0
23	F. R. Burfield	2.24	66.0
June 7	do	1 94	35.4
14	R. R. Randell	1.87	30.0
24	F. R. Burfield	1.84	29.0
26	do	2 31	76.2
July 9	F. R. Burfield	1.77	21.7
23	do	1.77	21.8
28	W. A. Lamb	1.80	22.0
Aug. 11	F. R. Burfield	1.84	27.3
29	do	1.74	18.3
Sept. 13	W. A. Lamb	1.74	17.1
Oct. 25	do	1.84	23.0
Nov. 25	J. E. Degnan	1.81	27.3
Dec. 6	do	1.76	20.2
17	do	1.69	14.6
31	do	2.12	14.1
1914.			
Jan. 13	J. E. Degnan	2.00	16.5
24	do	2.55	12.3
Feb. 10	do	3.42	13.5
27	do	2.93	16.2
Mar. 14	W. A. Burton	2.25	43.0
27	O. H. Hoover	1.97	24.0
Apr. 8	do	1.96	43.0
22	do	1.77	25.0
May 15	do	1.75	25.0
24	W. A. Lamb	1.75	24.0
June 5	O. H. Hoover	1.72	23.0
21	W. A. Lamb	1.64	15.6
24	O. H. Hoover	1.63	16.5
25	do	1.84	31.0
25	do	1.71	23.0
July 17	do	1.58	13.6
21	do	1.56	12.0
22	W. A. Lamb	1.54	11.4
Aug. 12	O. H. Hoover	1.57	13.5
Sept. 3	do	1.59	14.1
7	G. H. Whyte	1.58	13.8
10	W. A. Lamb	1.60	13.2
18	O. H. Hoover	1.61	14.9
Oct. 14	do	2.40	101.0
15	do	2.42	110.0
Nov. 13	do	1.78	26.0
27	do	1.89	34.0
Dec. 15	do	2.12	15.7
1915.			
Jan. 1	O. H. Hoover	2.11	15.4
22	J. E. Degnan	2.27	16.3
Feb. 10	do	2.48	16.4
25	do	1.91	17.5
Mar. 16	do	3.23	112.0
16	do	3.46	166.0
17	do	2.95	96.0
26	do	1.95	38.0
Apr. 21	V. A. Newhall	1.82	32.0
25	W. A. Lamb	1.76	25.0
May 7	V. A. Newhall	1.84	32.0
9	do	1.76	26.0
27	W. A. Lamb	1.76	25.0
June 16	V. A. Newhall	2.33	90.0
17	do	2.30	86.0
17	do	2.24	83.0
18	do	2.74	159.0
July 14	B. E. Jones	2.26	80.0
14	do	2.26	80.0
14	V. A. Newhall	2.27	83.0
14	do	2.25	82.0
15	do	2.21	75.0
Aug. 4	do	2.20	70.0
9	W. A. Lamb	2.13	61.0
18	V. A. Newhall	2.10	57.0
30	do	2.05	50.0
Oct. 8	do	2.34	84.0
Nov. 11	W. H. Storey	a 2.43	39.0
Dec. 6	do	2.06	56.0
7	do	1.97	44.0
23	do	2.02	40.0

a Ice present.

Discharge measurements of North Fork of Milk River near international boundary, 1910–1917—Continued.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1916.		*Feet.*	*Sec.-ft.*	1917.		*Feet.*	*Sec.-ft.*
Jan. 11	W. H. Storey	[a] 3.09	32.0	Jan. 4	H. W. Rowley	2.29	[a] 32
Feb. 11	V. A. Newhall	3.57	[b] 5.5	6	do	3.10	[a] 45
Mar. 2	do	[a] 3.11	36.0	23	do	2.49	[a] 27
16	S. H. Frame	2.45	91.0	Feb. 21	G. S. Wenden	2.20	[a] 38
Apr. 6	do	2.30	74.0	Mar. 14	do	2.22	[a] 28
25	do	2.07	58.0	Apr. 3	A. W. P. Lowrie	2.23	[a] 46
26	W. A. Lamb	2.10	55.0	9	do	4.05	[c]462
May 24	do	2.45	106.0	9	do	3.98	491
31	S. H. Frame	2.45	99.0	10	do	3.25	311
June 1	do	2.84	180.0	10	do	3.29	319
11	A. H. Tuttle	2.90	182.0	16	W. A. Lamb	2.16	101
21	S. H. Frame	2.44	103.0	May 4	A. W. P. Lowrie	2.64	181
27	do	2.47	120.0	5	do	2.44	142
27	A. H. Tuttle	2.50	104.0	30	do	2.34	129
28	S. H. Frame	3.32	267.0	June 16	W. A. Lamb	1.99	84
July 19	W. A. Lamb	2.23	72.0	21	A. W. P. Lowrie	1.96	82
23	W. A. Burton	2.13	62.0	July 10	do	3.12	264
Aug. 19	V. A. Newhall	2.38	92.0	20	W. A. Lamb	3.10	265
Sept. 5	S. H. Frame	2.38	101.0	27	A. W. P. Lowrie	3.20	305
6	do	2.28	80.0	Aug. 18	W. A. Lamb	3.23	304
7	do	2.21	73.0	26	A. W. P. Lowrie	3.24	303
7	do	2.27	71.0	Sept. 15	W. A. Lamb	1.81	51
27	do	2.19	59.0	20	A. W. P. Lowrie	1.73	41
28	do	2.14	52.0	Oct. 15	do	1.66	34
Nov. 15	do	[a] 2.49	53.0	Nov. 7	do	1.71	38
16	do	2.41	55.0	10	B. E. Jones	1.70	36
Dec. 12	H. W. Rowley	[a] 2.36	41.0	24	S. H. Frame	1.71	37
				Dec. 5	D. G. Chadsey	[a] 1.97	35

[a] Ice present. [b] Estimated. [c] Ice going out.

NOTE.—W. A. Lamb, A. H. Tuttle, and B. E. Jones are engineers employed by United States Geological Survey.

Daily discharge, in second-feet, of North Fork of Milk River near international boundary, 1909–1917.

Day.	July.	Aug.	Sept.	Oct.	Nov.	Day.	July.	Aug.	Sept.	Oct.	Nov.
1909.						1909.					
1	.....	62	46	50	50	16	.....	50	50	50	54
2	.....	62	46	50	50	17	.....	56	50	50	54
3	.....	62	46	50	50	18	.....	56	50	50	54
4	.....	62	46	50	50	19	.....	56	50	50	54
5	.....	56	46	50	50	20	.....	56	50	50	54
6	.....	56	46	50	50	21	51	52	50	50	.....
7	.....	56	46	50	50	22	50	50	50	50	.....
8	.....	56	46	50	50	23	50	46	50	50	.....
9	.....	56	46	50	50	24	42	46	50	50	.....
10	.....	56	46	50	50	25	53	46	50	50	.....
11	.....	56	46	50	50	26	177	46	50	50	.....
12	.....	56	46	50	50	27	591	46	50	50	.....
13	.....	56	46	50	54	28	591	46	50	50	.....
14	.....	56	46	50	54	29	118	46	50	50	.....
15	.....	50	46	50	54	30	94	46	50	50	.....
						31	87	46	50	50	.....

Daily discharge, in second-feet, of North Fork of Milk River near international boundary, 1909–1917—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1910.												
1	.....	.....	.....	.....	36	30	25.0	22.0	26.0	22.0	18.0	.....
2	.....	.....	.....	.....	36	30	25.0	22.0	27.5	21.0	a22.5	.....
3	.....	.....	.....	.....	38	31	24.5	22.0	28.5	21.0	a 26.5	.....
4	.....	.....	.....	.....	38	32	24.5	22.0	35.5	21.0	32.0	.....
5	.....	.....	.....	.....	36	28	22.0	22.0	39.0	21.0	32.5	.....
6	.....	.....	.....	.....	36	27	21.5	22.0	25.5	21.0	a 25.5	.....
7	.....	.....	.....	37	34	32	22.5	22.0	35.5	21.0	18.0	.....
8	.....	.....	.....	37	34	66	28.5	21.0	28.0	21.0	19.0	.....
9	.....	.....	.....	37	34	40	30.5	21.0	25.5	21.0	25.0	.....
10	.....	.....	.....	36	33	32	31.0	21.0	28.5	21.0	33.0	.....
11	.....	.....	.....	40	31	26	31.5	21.0	26.0	21.0	26.0	.....
12	.....	.....	.....	41	30	23	29.0	21.0	24.5	21.0	22.5	.....
13	.....	.....	.....	43	32	25	29.0	21.0	23.0	21.0	27.5	.....
14	.....	.....	.....	40	33	25	28.5	22.0	22.0	21.0	27.5	.....
15	.....	.....	.....	40	35	25	29.0	25.0	22.0	21.0	31.0	.....
16	.....	.....	.....	38	37	25	29.5	24.5	22.0	21.0	25.5	.....
17	.....	.....	.....	41	35	28	29.0	23.0	22.0	22.5	32.0	.....
18	.....	.....	.....	42	35	26	29.5	22.0	21.0	22.0	29.5	.....
19	.....	.....	.....	43	36	27	29.0	22.0	20.5	21.0	29.5	.....
20	.....	.....	.....	44	38	30	29.5	21.0	20.0	21.0	28.0	.....
21	.....	.....	.....	42	44	32	29.0	20.0	21.0	20.5	28.0	.....
22	.....	.....	.....	40	38	32	29.5	19.0	29.5	20.5	28.0	.....
23	.....	.....	.....	38	34	30	29.0	22.0	26.0	18.5	26.5	.....
24	.....	.....	.....	36	28	28	23.0	20.5	29.5	18.0	26.0	.....
25	.....	.....	.....	34	30	27	22.0	21.0	28.0	22.5	26.5	.....
26	.....	.....	.....	31	31	26	22.0	21.0	26.5	33.5	29.5	.....
27	.....	.....	.....	32	29	27	22.0	20.5	23.0	21.0	32.0	.....
28	.....	.....	.....	32	28	26	22.0	19.5	22.0	20.0	32.0	.....
29	.....	.....	.....	35	28	26	22.0	19.5	22.0	19.5	32.0	.....
30	.....	.....	.....	36	28	25	22.0	19.5	22.0	19.5	32.0	.....
31	.....	.....	.....	.....	31	.....	22.0	18.5	.....	19.5	.....	.....
1911.												
1	.....	.....	.....	.....	39	45	43	36	24	36	43	.....
2	.....	.....	.....	.....	39	39	42	35	24	37	43	.....
3	.....	.....	.....	.....	39	38	41	44	25	34	.....	.....
4	.....	.....	.....	.....	39	37	39	139	144	32	.....	.....
5	.....	.....	.....	.....	40	32	37	112	202	41	.....	.....
6	.....	.....	.....	.....	40	36	36	81	136	38	.....	.....
7	.....	.....	.....	.....	40	36	34	68	111	37	.....	.....
8	.....	.....	.....	.....	40	39	32	53	102	36	.....	.....
9	.....	.....	.....	.....	40	36	31	55	100	36	.....	.....
10	.....	.....	.....	.....	40	32	30	52	94	35	.....	.....
11	.....	.....	.....	.....	40	30	28	47	94	35	.....	.....
12	.....	.....	.....	.....	40	30	28	38	91	34	.....	.....
13	.....	.....	.....	.....	42	28	27	36	84	34	.....	.....
14	.....	.....	.....	.....	65	27	27	32	74	35	.....	.....
15	.....	.....	.....	.....	244	25	27	28	68	36	.....	.....
16	.....	.....	.....	.....	142	24	27	28	54	36	.....	.....
17	.....	.....	.....	.....	74	23	28	27	43	36	.....	.....
18	.....	.....	.....	.....	60	22	36	27	42	35	.....	.....
19	.....	.....	.....	42	56	21	32	27	41	37	.....	.....
20	.....	.....	.....	42	53	21	29	28	41	38	.....	.....
21	.....	.....	.....	44	49	53	29	28	40	37	.....	.....
22	.....	.....	.....	44	61	46	77	27	30	39	.....	.....
23	.....	.....	.....	56	43	555	42	27	34	39	.....	.....
24	.....	.....	.....	111	172	308	40	27	39	40	.....	.....
25	.....	.....	.....	100	96	375	38	26	39	39	.....	.....
26	.....	.....	.....	89	45	87	36	26	38	41	.....	.....
27	.....	.....	.....	78	39	65	33	25	37	44	.....	.....
28	.....	.....	.....	56	38	47	32	25	37	44	.....	.....
29	.....	.....	.....	39	37	41	29	25	36	45	.....	.....
30	.....	.....	.....	39	37	53	74	25	35	44	.....	.....
31	.....	.....	.....	.....	37	.....	41	24	.....	42	.....	.....

a Interpolated.

Daily discharge, in second-feet, of North Fork of Milk River near international boundary, 1909–1917—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1912.												
1	.....	.....	.....	.....	50	36	46	23	21	24	28	20
2	.....	.....	.....	.....	51	35	49	26	20	24	33	20
3	.....	.....	.....	.....	51	31	46	25	22	24	37	24
4	.....	.....	.....	.....	51	30	43	23	27	23	32	.....
5	.....	.....	.....	.....	51	30	38	23	28	23	38	.....
6	.....	.....	.....	.....	52	28	33	22	27	23	42	.....
7	.....	.....	.....	.....	50	28	31	22	29	23	40	.....
8	.....	.....	.....	.....	51	27	69	22	28	23	41	.....
9	.....	.....	.....	37	52	31	53	22	25	24	40	.....
10	.....	.....	.....	47	54	31	52	22	24	25	41	.....
11	.....	.....	.....	51	53	30	45	22	23	27	42	.....
12	.....	.....	.....	55	53	28	40	22	23	29	34	.....
13	.....	.....	.....	57	51	28	44	22	22	28	28	.....
14	.....	.....	.....	55	49	27	40	22	22	26	26	.....
15	.....	.....	.....	53	48	29	39	21	21	26	29	.....
16	.....	.....	.....	53	45	34	33	23	22	26	33	.....
17	.....	.....	.....	52	45	33	31	22	22	26	41	.....
18	.....	.....	.....	52	44	30	29	21	[a] 23	28	42	.....
19	.....	.....	.....	51	41	27	25	[a] 21	[a] 26	26	[a] 43	.....
20	.....	.....	.....	51	46	27	27	21	27	24	43	.....
21	.....	.....	.....	50	93	27	58	20	30	21	41	.....
22	.....	.....	.....	50	180	28	62	21	31	22	38	.....
23	.....	.....	.....	48	116	29	72	20	32	27	33	.....
24	.....	.....	.....	49	89	29	60	20	30	36	29	.....
25	.....	.....	.....	49	64	30	46	20	28	34	28	.....
26	.....	.....	.....	51	52	30	37	20	27	33	25	.....
27	.....	.....	.....	50	46	29	27	20	28	31	24	.....
28	.....	.....	.....	50	45	30	25	20	26	38	22	.....
29	.....	.....	.....	51	43	35	23	20	25	31	22	.....
30	.....	.....	.....	52	41	54	22	20	24	24	21	.....
31	.....	.....	.....	.....	39	.....	22	20	.....	28	.....	.....
1913.												
1	12.6	17.4	22	[a] 24	46	47	42.0	18.7	24.0	30	26	19.5
2	13.0	17.4	21	32	48	44	32.0	17.9	24.0	29	27	18.8
3	13.0	17.9	21	40	56	43	26.0	18.7	23.0	29	33	23.0
4	12.8	18.7	22	48	45	43	31.0	18.7	24.0	30	38	20.0
5	13.5	19.0	23	56	44	39	29.0	18.7	24.0	30	26	18.8
6	13.3	19.4	24	64	42	38	24.0	17.9	25.0	30	25	21.0
7	12.2	19.5	29	72	51	38	22.0	17.0	25.0	30	24	17.9
8	11.7	19.4	34	80	47	39	18.7	27.0	25.0	31	24	18.8
9	11.1	18.9	35	90	41	38	21.0	46.0	25.0	32	24	22.0
10	10.6	18.3	34	100	43	42	19.5	27.0	25.0	33	23	23.0
11	8.9	18.6	32	140	59	39	25.0	27.0	25.0	35	24	19.5
12	9.9	18.6	28	180	58	41	25.0	24.0	25.0	71	22	20.0
13	10.4	18.8	24	220	57	33	22.0	22.0	25.0	53	33	22.0
14	13.1	19.0	24	278	52	32	20.0	25.0	25.0	41	44	21.0
15	13.2	19.2	24	172	51	30	20.0	23.0	25.0	33	33	18.8
16	13.6	22.0	24	93	59	28	20.0	22.0	25.0	31	22	18.8
17	13.4	26.0	24	87	79	27	19.5	23.0	26.0	32	21	19.5
18	13.6	26.0	24	76	88	27	18.7	26.0	26.0	31	21	14.6
19	14.2	26.0	23	72	93	31	18.7	24.0	27.0	27	47	14.5
20	10.6	26.0	23	70	79	52	17.9	23.0	26.0	27	37	14.5
21	10.1	26.0	23	54	74	34	17.9	21.0	27.0	24	27	14.5
22	10.6	26.0	23	39	75	28	18.7	19.5	34.0	25	29	14.5
23	11.3	24.0	23	35	68	28	21.0	19.5	37.0	23	26	14.4
24	12.5	23.0	23	31	63	27	18.7	18.7	32.0	24	24	14.4
25	12.7	20.0	23	34	62	38	22.0	18.7	25.0	23	23	14.3
26	14.0	22.0	23	32	63	54	45.0	18.7	19.5	22	27	14.3
27	14.7	22.0	23	31	63	71	31.0	18.7	19.5	21	26	14.3
28	15.1	22.0	24	30	61	75	24.0	17.9	19.5	24	26	14.3
29	15.4	.....	24	30	65	55	24.0	18.7	19.5	24	24	14.2
30	16.5	.....	23	31	52	55	26.0	24.0	24.0	24	23	14.2
31	16.7	.....	23	.....	48	.....	21.0	26.0	.....	41	.....	14.1

[a] Interpolated.

Daily discharge, in second-feet, of North Fork of Milk River near international boundary, 1909–1917—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1914.												
1	14.0	13.3	16.8	34.0	26.0	16.0	14.9	13.8	14.9	14.9	30.0	23.0
2	13.4	12.7	17.3	33.0	26.0	16.6	13.8	13.8	14.3	18.5	28.0	30.0
3	13.8	12.0	18.3	a 35.0	26.0	17.2	14.3	12.8	14.3	21.0	29.0	26.0
4	14.2	11.5	19.4	197.0	34.0	18.5	13.3	11.9	13.8	20.0	28.0	20.0
5	15.2	11.2	21.0	517.0	35.0	22.0	17.9	12.4	13.8	23.0	27.0	27.0
6	18.0	11.8	22.0	a 282.0	52.0	23.0	18.5	11.5	13.3	31.0	24.0	27.0
7	17.8	12.3	22.0	a 48.0	44.0	20.0	17.2	11.1	13.8	37.0	23.0	31.0
8	16.9	13.1	22.0	a 43.0	37.0	19.8	15.5	11.1	15.5	29.0	21.0	32.0
9	16.2	13.6	21.0	a 42.0	34.0	18.5	14.9	11.9	14.9	22.0	20.0	28.0
10	15.3	13.5	20.0	a 41.0	30.0	17.2	14.9	12.8	13.3	23.0	19.2	24.0
11	15.3	13.3	42.0	a 40.0	27.0	17.2	15.5	12.4	12.4	22.0	19.8	22.0
12	16.2	12.7	42.0	a 39.0	25.0	17.2	16.0	12.4	16.0	20.0	20.0	21.0
13	16.5	13.0	42.0	a 38.0	26.0	24.0	16.0	13.8	17.9	23.0	22.0	22.0
14	16.4	13.5	43.0	37.0	25.0	26.0	16.0	12.4	14.9	71.0	25.0	22.0
15	16.4	14.0	42.0	35.0	25.0	20.0	15.5	11.9	13.3	125.0	25.0	15.7
16	16.2	14.0	43.0	a 29.0	23.0	18.5	16.6	11.9	13.8	108.0	26.0	15.8
17	16.2	13.9	43.0	a 24.0	22.0	18.5	15.5	24.0	14.3	82.0	30.0	16.1
18	15.8	13.8	40.0	19.8	21.0	16.0	13.3	31.0	14.9	66.0	30.0	16.2
19	15.3	13.7	37.0	25.0	21.0	14.3	13.3	19.2	14.9	52.0	32.0	16.4
20	14.7	13.4	37.0	32.0	26.0	14.9	13.3	16.0	14.9	47.0	33.0	16.5
21	14.2	13.2	35.0	24.0	28.0	15.5	13.3	14.9	14.9	38.0	32.0	16.5
22	13.7	13.0	38.0	15.5	23.0	15.5	12.8	14.3	15.5	36.0	29.0	16.2
23	13.0	13.7	38.0	26.0	23.0	15.5	13.8	16.0	16.0	35.0	27.0	15.9
24	12.3	15.0	32.0	26.0	23.0	16.0	14.3	25.0	16.0	33.0	26.0	15.6
25	12.4	16.0	24.0	26.0	22.0	24.0	14.3	19.8	16.6	31.0	34.0	15.3
26	13.1	16.2	24.0	25.0	19.2	26.0	13.8	17.9	15.5	30.0	37.0	15.2
27	14.0	16.2	24.0	25.0	17.9	17.2	14.3	16.0	14.9	29.0	40.0	15.2
28	12.7	16.4	25.0	26.0	17.2	15.5	13.8	14.9	14.3	29.0	32.0	15.4
29	13.2	.....	27.0	29.0	16.0	14.3	14.3	14.3	14.9	29.0	103.0	15.5
30	14.0	.....	31.0	28.0	16.0	15.5	14.3	14.9	14.9	29.0	47.0	15.6
31	13.7	.....	34.0	.....	16.0	.....	13.3	14.3	.....	30.0	.....	15.5
1915.												
1	15.5	16.8	19.1	86	63	26	132	116	48	59	65	36
2	15.6	16.8	19.2	190	36	42	113	97	116	59	65	46
3	15.8	16.8	19.3	82	26	181	114	80	297	89	65	51
4	a 16.0	16.8	19.8	54	24	202	100	72	103	90	66	54
5	15.5	16.8	21.0	46	30	217	95	68	72	86	66	58
6	14.9	16.7	21.0	44	28	124	105	64	59	86	67	56
7	14.9	16.6	21.0	45	31	89	111	61	57	89	66	43
8	a 15.0	16.5	22.0	36	29	89	98	59	57	92	65	43
9	15.5	16.4	21.0	33	26	75	93	62	72	78	66	40
10	16.0	16.5	a 21.0	33	25	217	101	58	93	75	58	36
11	16.4	16.5	21.0	33	23	119	89	57	80	80	39	36
12	16.5	16.7	22.0	37	22	93	87	57	87	87	38	35
13	16.2	17.0	a 36.0	37	35	81	86	58	84	81	37	35
14	15.8	17.1	60.0	39	76	108	82	58	82	80	46	35
15	15.3	17.2	85.0	36	87	98	74	58	66	87	48	34
16	15.2	17.2	139.0	36	76	97	74	57	59	76	58	33
17	15.6	17.2	178.0	34	84	103	141	56	58	71	50	35
18	15.8	17.2	169.0	32	54	153	190	56	58	67	56	38
19	16.0	17.5	137.0	30	44	119	103	95	65	65	58	36
20	a 16.2	17.6	124.0	28	36	89	86	127	72	65	36	36
21	a 16.3	17.8	119.0	28	32	75	75	84	66	65	34	36
22	16.4	a 17.8	116.0	28	30	72	70	72	62	65	32	38
23	16.2	17.7	103.0	27	29	72	72	66	62	65	54	40
24	16.1	a 17.5	89.0	25	28	69	97	63	78	64	50	40
25	15.9	17.5	86.0	24	28	224	86	61	69	64	35	40
26	15.8	17.6	58.0	21	26	231	103	59	67	64	46	40
27	15.7	18.1	57.0	20	27	178	100	58	65	65	46	40
28	15.8	18.8	57.0	19	25	141	130	57	65	65	46	39
29	16.0	.....	57.0	17	26	103	143	56	67	65	42	38
30	16.5	.....	54.0	22	26	105	119	53	65	66	39	36
31	16.8	.....	46.0	.....	26	.....	90	50	.....	65	.....	35

a Interpolated.

Daily discharge, in second-feet, of North Fork of Milk River near international boundary, 1909–1917—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1916.												
1	34.0	18.3	36	81	74	158	102	56	78	53	53	a 49.0
2	34.0	16.6	36	80	88	145	93	56	78	56	55	48.0
3	34.0	15.0	37	83	74	96	96	56	170	56	54	48.0
4	33.0	13.6	40	63	63	84	86	57	230	59	53	47.0
5	33.0	12.0	43	57	62	149	78	61	122	65	53	47.0
6	33.0	a 10.4	46	74	56	159	76	58	82	80	50	47.0
7	33.0	9.0	51	80	55	102	74	58	76	80	54	47.0
8	33.0	8.0	64	81	53	88	78	64	75	64	81	46.0
9	32.0	7.0	83	90	51	84	78	158	72	60	56	45.0
10	a 32.0	a 6.1	104	96	47	148	71	137	74	60	44	44.0
11	32.0	5.5	123	90	47	169	64	104	67	63	46	42.0
12	32.0	5.0	144	100	53	101	64	83	63	62	48	41.0
13	32.0	10.0	a 164	103	55	84	66	100	67	58	a 50	40.0
14	32.0	80.0	189	91	56	82	64	95	79	54	a 52	40.0
15	31.0	150.0	154	73	50	75	60	74	75	53	53	38.0
16	a 31.0	a 700.0	91	86	61	73	57	70	70	53	55	37.0
17	31.0	600.0	82	85	51	71	64	82	65	56	56	36.0
18	31.0	400.0	58	82	50	68	76	134	63	62	56	35.0
19	30.0	200.0	80	81	49	80	74	93	61	63	56	34.0
20	31.0	180.0	102	73	50	88	70	80	59	72	56	32.0
21	32.0	170.0	100	66	48	100	64	80	59	85	a 56	30.0
22	34.0	160.0	76	68	45	110	62	79	57	72	a 56	28.0
23	35.0	150.0	62	65	70	125	58	77	57	60	a 56	26.0
24	a 34.0	140.0	54	61	106	80	62	82	55	60	56	24.0
25	32.0	115.0	53	58	a 166	90	66	86	50	57	55	21.0
26	30.0	80.0	61	56	225	94	74	87	51	57	54	19.0
27	29.0	55.0	68	128	178	108	104	83	58	60	54	17.0
28	a 27.0	45.0	57	130	140	241	78	82	53	57	53	15.2
29	25.0	38.0	48	55	a 158	214	61	82	52	54	a 52	13.8
30	22.0	.....	50	54	175	162	55	84	51	53	a 51	15.0
31	20.0	.....	a 65	.....	99	.....	55	80	.....	55	.....	17.0
1917.												
1	20	17	23	45	132	a 119	192	323	316	46	58	33
2	24	18	24	45	204	119	194	328	311	45	53	34
3	28	20	25	46	252	a 112	a 208	323	311	43	47	34
4	31	23	26	48	184	105	223	328	316	40	44	34
5	40	27	26	50	150	a 102	236	322	316	39	42	35
6	45	31	27	a 52	271	98	236	319	309	38	40	35
7	47	36	27	a 150	295	a 94	234	319	302	36	40	36
8	47	40	28	a 300	225	90	232	326	302	35	39	36
9	47	44	28	482	219	a 121	243	323	309	a 36	39	36
10	46	46	28	326	208	a 152	262	323	287	38	37	34
11	44	47	28	410	208	184	248	328	304	a 38	37	34
12	41	47	28	375	216	a 154	273	321	266	37	36	34
13	38	47	28	255	212	123	283	319	128	a 36	35	32
14	35	47	28	198	196	a 110	292	311	64	a 35	34	33
15	32	47	28	159	182	97	290	307	50	34	34	34
16	28	46	27	105	170	a 93	285	307	44	34	33	35
17	27	45	27	98	122	a 89	273	304	43	40	34	35
18	27	44	27	121	121	85	271	304	43	42	37	35
19	28	42	27	139	122	a 91	266	309	42	42	34	35
20	28	40	28	160	140	97	264	314	41	44	34	35
21	28	38	30	161	166	89	278	311	50	44	34	35
22	28	37	32	173	136	81	290	309	46	41	37	36
23	27	34	34	170	136	82	297	309	46	41	37	36
24	27	30	36	128	145	90	297	309	58	45	35	36
25	28	21	38	146	154	89	314	309	50	42	34	37
26	28	20	39	145	156	85	304	304	46	42	34	37
27	28	21	40	139	142	85	302	304	47	36	33	38
28	28	21	41	110	151	83	316	304	47	42	33	39
29	25	.....	42	118	204	84	319	304	46	50	34	40
30	21	.....	43	161	135	84	316	309	45	41	34	80
31	18	.....	44	.....	119	.....	326	321	.....	45	.....	100

a Estimated.

NOTE.—1910: Shifting control Apr. 7 to June 30; records roughly approximate owing to inaccurate gage heights.

1911: Records Apr. 19 to Sept. 25 roughly approximate owing to inaccurate gage heights.

1912: Records roughly approximate owing to inaccurate gage heights.

1913: Stage-discharge relation affected by ice Jan. 1 to Apr. 13 and Dec. 18–31. Records Jan. 1 to Apr. 30 from gage in NE. ¼ sec. 13, T. 1, R. 23 W. fourth meridian; May 1 to June 30, from gage in NE. ¼ sec. 11, T. 1, R. 23; Aug. 30 to Sept. 22, from gage in NE. ¼ sec. 13, T. 1, R. 23; records Aug. 30 to Sept. 22 roughly approximate owing to inaccurate gage heights.

1914: Stage-discharge relation affected by ice Jan. 1 to Apr. 2 and Dec. 9–31.

1915: Stage-discharge relation affected by ice Jan. 1 to Mar. 16 and Nov. 11 to Dec. 31.

1916: State-discharge relation affected by ice Jan. 1 to Mar. 13 and Nov. 11 to Dec. 31.

1917: Stage-discharge relation affected by ice Jan. 1 to Apr. 5 and Dec. 2–31. Shifting control July 2 to Aug. 14, Sept. 11–15, and Oct. 1 to Nov. 9.

Monthly discharge of North Fork of Milk River near international boundary, 1909–1917.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1909.						
July 21-31	591	42	173	1.713	0.70	3,774
August	62	46	53	.525	.61	3,259
September	50	46	48	.475	.53	2,856
October	50	50	50	.495	.57	3,074
November 1-20	54	50	52	.514	.38	2,063
The period					2.79	15,026
1910.						
April 7-30	44.0	31.0	38.1	.350	.312	1,814
May	58.0	28.0	34.4	.316	.364	2,115
June	66.0	23.0	29.6	.272	.304	1,761
July	31.5	21.5	26.2	.240	.277	1,611
August	25.0	18.5	21.3	.195	.225	1,310
September	39.0	20.0	25.7	.236	.263	1,529
October	33.5	18.0	21.2	.194	.224	1,304
November	33.0	18.0	27.4	.251	.280	1,630
The period					2.249	13,074
1911.						
April 19-30	111	39	61.7	.566	.25	1,468
May	244	37	60.2	.552	.64	3,702
June	555	21	75.0	.688	.77	4,463
July	77	27	36.3	.333	.38	2,232
August	139	24	41.2	.378	.44	2,533
September	202	24	65.3	.599	.67	3,886
October	45	32	37.8	.347	.40	2,324
November 1-2	43	43	43.0	.394	.03	171
The period					3.58	20,779
1912.						
April 9-30	57	37	50.6	.465	.38	2,210
May	180	39	57.9	.531	.61	3,560
June	54	27	30.7	.282	.31	1,827
July	72	22	40.9	.375	.43	2,515
August	26	20	21.5	.197	.23	1,322
September	32	20	25.4	.233	.26	1,511
October	38	21	26.7	.245	.28	1,642
November	43	21	33.9	.311	.35	2,017
December 1-3	24	20	21.3	.195	.02	127
The period					2.87	16,731
1913.						
January	16.7	8.9	12.7	.116	.13	781
February	26.0	17.4	21.1	.194	.20	1,172
March	35.0	21.0	24.8	.228	.26	1,525
April	278.0	24.0	78.0	.716	.80	4,641
May	93.0	41.0	59.1	.585	.67	3,634
June	75.0	27.0	40.5	.401	.45	2,410
July	45.0	17.9	24.0	.238	.27	1,476
August	46.0	17.0	22.2	.220	.25	1,365
September	37.0	19.5	25.2	.250	.28	1,500
October	71.0	21.0	31.0	.307	.35	1,906
November	47.0	21.0	27.6	.273	.30	1,642
December	23.0	14.1	17.5	.173	.20	1,076
The year					4.16	23,128
1914.						
January	18.0	12.3	14.8	.147	.17	910
February	16.4	11.2	13.6	.135	.14	755
March	43.0	16.8	30.4	.301	.35	1,869
April	517.0	15.5	61.4	.608	.68	3,654
May	52.0	16.0	26.0	.257	.30	1,599
June	26.0	14.3	18.3	.181	.20	1,089
July	18.5	12.8	14.8	.147	.17	910
August	31.0	11.1	15.2	.150	.17	935
September	17.9	12.4	14.8	.147	.16	881
October	125.0	14.9	38.9	.385	.44	2,392
November	103.0	19.2	30.6	.303	.34	1,821
December	32.0	15.2	20.1	.199	.23	1,236
The year					3.35	18,051

Monthly discharge of North Fork of Milk River near international boundary, 1909–1917—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1915.						
January	16.8	14.9	15.8	0.156	0.18	972
February	18.8	16.4	17.2	.170	.18	955
March	178.0	19.1	65.0	.644	.74	3,997
April	190.0	17.0	41.0	.406	.45	2,440
May	87.0	22.0	37.0	.366	.42	2,275
June	231.0	26.0	120.0	1.190	1.33	7,140
July	190.0	70.0	102.0	1.010	1.15	6,272
August	127.0	50.0	68.0	.673	.78	4,181
September	297.0	48.0	78.0	.772	.86	4,641
October	92.0	59.0	73.0	.722	.83	4,489
November	67.0	32.0	51.0	.505	.56	3,035
December	58.0	33.0	40.0	.396	.46	2,460
The year	.....	.....	.....	.....	7.94	42,857
1916.						
January	35	20.0	31	.307	.35	1,906
February	700	5.0	117	1.160	1.25	6,730
March	189	36.0	78	.772	.89	4,796
April	130	54.0	80	.792	.88	4,760
May	225	45.0	82	.812	.94	5,042
June	241	68.0	114	1.130	1.26	6,783
July	104	55.0	72	.713	.82	4,427
August	158	56.0	83	.822	.95	5,103
September	230	50.0	76	.752	.84	4,522
October	85	53.0	61	.604	.70	3,751
November	81	44.0	54	.535	.60	3,213
December	49	13.8	34	.337	.39	2,091
The year	.....	.....	.....	.....	9.87	53,124
1917.						
January	47	18.0	32	.....	.....	1,968
February	47	17.0	35	.....	.....	1,944
March	44	23.0	31	.....	.....	1,906
April	482	45.0	167	.....	.....	9,937
May	295	119.0	177	.....	.....	10,883
June	184	81.0	103	.....	.....	6,129
July	326	192.0	270	.....	.....	16,602
August	328	304.0	315	.....	.....	19,369
September	316	41.0	153	.....	.....	9,104
October	50	34.0	40	.....	.....	2,460
November	58	33.0	38	.....	.....	2,261
December	100	32.0	39	.....	.....	2,398
The year	.....	.....	.....	.....	.....	84,961

In 1913 during January, February, March, April, records are from the station on NE. ¼ sec. 13, T. 1, R. 23 W. fourth meridian.

In 1917, run-off not computed owing to part of the discharge being from the St. Mary canal, United States Reclamation Service.

Mean monthly discharge, in second-feet, of North Fork of Milk River near international boundary, 1909–1917.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total in acre-feet.
1909	.....	.....	.....	.....	.....	.....	[a]173	53	48	50	[b]52	.....	[a]16,057
1910	.....	.....	.....	[b]38	34	30	26	21	26	21	27	.....	[a]13,074
1911	.....	.....	.....	[a]62	60	75	36	41	65	38	[a]43	.....	[a]20,779
1912	.....	.....	.....	[c]42	58	31	41	22	25	27	34	[a]21	[a]16,731
1913	13	21	25	78	59	40	24	22	25	31	28	18	23,128
1914	15	14	30	61	26	18	15	15	15	39	31	20	18,051
1915	16	17	65	41	37	120	102	68	78	73	51	40	42,857
1916	31	117	78	80	82	114	72	83	76	61	54	34	53,124
1917	32	35	31	167	177	103	[d]270	[d]315	[d]153	40	38	39	[d]84,961
Average	21	41	46	72	67	66	45	40	45	42	39	30	34,290
Average run-off, acre-feet	1,291	2,312	2,828	4,284	4,120	3,927	2,767	2,460	2,678	2,582	2,321	1,906	33,476
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	331

[a] Incomplete record not included in average.
[b] Average for part of month assumed as monthly average.
[c] Estimated.
[d] Not used in average as flow included water from St. Mary River.

NOTE.—Water diverted during 1917 from St. Mary River below Lower St. Mary Lake was delivered to the North Fork of Milk River a few miles above this station by the United States Reclamation Service, St. Mary canal. The quantities thus delivered to this stream are shown in the following table:

Month.	Water delivered.	
	Second-feet.	Acre-feet.
June	.....	0
July 3–31	218	12,500
August	254	15,600
September 1–13	215	5,540
The period	.....	33,640

NORTH FORK OF MILK RIVER AT KNIGHT'S RANCH, ALTA.

LOCATION.—In NE. ¼ sec. 18, T. 2, R. 20 W. fourth meridian, almost directly south of the Knight Sugar Co.'s Horseshoe ranch buildings, about 33 miles by trail from Kimball.

DRAINAGE AREA.—239 square miles.

RECORDS AVAILABLE.—Open-water records July 17, 1909, to August 25, 1914, when station was discontinued.

GAGE.—Vertical staff, read by E. Whitney.

DISCHARGE MEASUREMENTS.—Made by wading or from cable.

CHANNEL AND CONTROL.—Bed composed of mud and large cobbles. One channel at all stages. Right bank high, not subject to overflow; left bank low, subject to overflow.

EXTREMES OF STAGE.—1909–1914: Maximum stage recorded, 3.44 feet July 28, 1909 (discharge, 398 second-feet); minimum stage recorded, 0.80 foot August 6, 1914 (discharge, 7 second-feet).

ACCURACY.—Control was fairly permanent while station was being maintained. Rating curves fairly well defined. Records fair.

Discharge measurements of North Fork of Milk River at Knight's ranch, Alta, 1910–1914.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1910.		*Feet.*	*Sec.-ft.*	1910.		*Feet.*	*Sec.-ft.*
Apr. 8	L. J. Gleeson	1.86	50.7	Sept. 29	N. M. Sutherland	1.68	30.5
14	do	1.86	52.6	Oct. 11	do	1.62	23.5
20	do	1.89	44.4	22	do	1.63	25.4
28	do	1.87	43.9	27	do	1.60	18.3
May 4	do	1.84	40.6	Nov. 4	do	1.60	19.3
11	do	2.03	69.4	13	do	1.67	28.0
19	do	1.95	56.9				
25	do	1.85	44.2	1913.			
June 1	do	1.71	30.7	Apr. 23	G. F. Deas	1.75	73.0
8	do	1.92	57.5	May 22	F. R. Burfield	1.68	73.0
15	do	1.70	27.1	June 25	do	1.30	30.2
22	do	1.67	25.1	July 10	do	1.20	23.3
29	do	1.63	22.5	24	do	1.22	24.8
July 6	do	1.61	21.6	Aug. 30	do	1.16	21.5
23	F. H. Peters	1.56	18.3	Oct. 11	L. Danielsen	1.30	30.0
29	do	1.56	18.4	Nov. 19	do	[a] 1.42	8.6
Aug. 4	do	1.56	18.3				
11	do	1.56	18.8	1914.			
20	N. M. Sutherland	1.54	17.5	Apr. 9	O. H. Hoover	1.61	70.0
25	do	1.62	22.2	24	do	1.15	32.0
Sept. 10	do	1.68	28.2	May 18	do	1.11	27.0
17	do	1.625	24.2	June 6	do	1 09	27.0
Sept. 23	do	1.72	39.0	July 20	do	0.90	13.0
24	do	1.68	29.7				

[a] Ice present.

NOTE.—No measurements in 1911, 1912.

Daily discharge, in second-feet, of North Fork of Milk River at Knight's ranch, Alta., 1909–10, 1913–14.

Day.	July.	Aug.	Sept.	Oct.	Nov.	Day.	July.	Aug.	Sept.	Oct.	Nov.
1909.						1909.					
1	.....	82	47	52	43	16	.....	58	42	52	54
2	.....	82	47	52	43	17	62	58	42	52	54
3	.....	82	47	52	43	18	62	58	42	52	54
4	.....	82	47	52	43	19	62	58	42	52	54
5	.....	80	47	52	43	20	62	58	42	52	54
6	.....	75	38	52	43	21	62	58	42	52	54
7	.....	58	38	52	43	22	62	58	42	52	54
8	.....	58	38	52	43	23	62	47	42	52	54
9	.....	58	38	52	43	24	62	47	42	52	54
10	.....	58	38	52	43	25	62	47	42	52	54
11	.....	58	38	52	54	26	68	47	42	52	54
12	.....	58	38	52	54	27	196	47	42	52	.....
13	.....	58	38	52	54	28	398	47	42	52	.....
14	.....	58	38	52	54	29	181	47	42	52	.....
15	.....	58	38	52	54	30	96	47	42	52	.....
						31	82	47	.....	52	.....

Daily discharge, in second-feet, of North Fork of Milk River at Knight's ranch, Alta., 1909–10, 1913–14—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1910.								
1	.....	45.0	32.5	a 22.5	a 18.0	a 22.5	a 26.5	a 21.0
2	.....	42.5	a 35.0	a 22.5	a 18.0	a 23.5	a 26.0	a 21.0
3	.....	41.5	a 38.0	a 22.5	a 18.0	a 23.5	a 26.0	a 21.0
4	.....	40.0	a 41.5	a 22.5	a 18.0	a 24.0	a 25.0	21.0
5	.....	42.5	a 46.5	a 22.0	a 18.0	a 25.0	a 24.0	a 22.0
6	.....	42.0	a 49.5	22.0	a 18.0	a 25.0	a 24.0	a 22.5
7	.....	41.5	a 53.0	a 23.5	a 19.0	a 26.0	a 24.0	a 22.5
8	51.0	39.0	56.5	24.0	a 19.0	a 26.5	a 24.0	a 23.5
9	a 51.0	40.5	62.0	a 24.0	a 19.0	a 26.5	a 23.5	a 24.0
10	a 51.5	49.5	41.5	a 23.5	a 19.0	27.5	a 23.5	a 25.0
11	a 51.5	65.0	39.0	a 23.5	a 18.0	27.5	22.5	a 25.0
12	a 51.5	57.0	35.0	a 22.5	a 18.0	a 26.5	a 22.5	a 26.0
13	a 52.5	50.5	32.5	a 22.5	a 18.0	a 26.0	a 22.5	26.5
14	52.5	54.5	30.0	a 22.0	a 18.0	a 25.0	a 22.5	.....
15	a 50.5	58.0	27.5	a 22.0	a 18.0	a 25.0	a 22.5	.....
16	a 48.0	62.0	29.0	a 21.0	a 18.0	a 24.0	a 22.5	.....
17	a 47.0	66.5	28.5	a 21.0	a 18.0	23.5	a 23.5	.....
18	a 45.0	69.5	27.5	a 20.5	a 18.0	23.5	a 23.5	.....
19	a 44.5	73.0	27.0	a 20.5	a 18.0	a 25.0	a 23.5	.....
20	43.0	70.5	26.0	a 19.5	a 18.0	a 26.5	a 23.5	.....
21	43.0	66.5	26.0	a 19.5	a 17.5	a 27.5	a 23.5	.....
22	35.0	58.0	25.0	a 19.0	a 17.5	a 29.5	23.5	.....
23	38.0	49.5	26.5	19.0	a 17.5	a 31.5	a 22.5	.....
24	42.5	46.5	26.5	19.0	a 21.0	a 27.5	a 22.5	.....
25	40.5	44.0	26.0	19.0	a 23.5	a 27.5	a 22.0	.....
26	44.5	45.0	26.0	19.0	a 25.0	a 27.5	a 22.0	.....
27	44.0	44.5	26.0	19.0	a 25.0	a 27.5	21.0	.....
28	45.0	44.5	24.0	19.0	a 21.0	a 27.5	a 21.0	.....
29	44.0	46.5	a 23.5	18.0	a 22.0	27.5	a 21.0	.....
30	45.0	42.5	a 23.5	19.0	a 22.0	a 26.5	a 21.0	.....
31	.....	40.0	.....	18.0	a 22.5	.....	a 21.0	.....

Day.	June.	July.	Aug.	Sept.	Oct.	Day.	June.	July.	Aug.	Sept.	Oct.
1913.						1913.					
1	.....	61	24	27	23	16	.....	23	23	22	25
2	.....	40	23	23	23	17	.....	23	23	22	23
3	.....	31	23	23	23	18	.....	23	23	21	23
4	.....	31	23	21	24	19	.....	23	23	23	23
5	.....	31	25	21	25	20	.....	23	23	25	23
6	.....	23	23	21	35	21	.....	23	23	23	25
7	.....	27	23	21	35	22	.....	23	23	25	29
8	.....	23	26	21	35	23	.....	23	23	35	29
9	.....	23	45	21	33	24	.....	25	21	36	25
10	.....	23	50	20	31	25	.....	23	21	31	25
11	.....	27	56	21	31	26	45	27	21	29	.....
12	.....	27	31	21	43	27	72	25	21	26	.....
13	.....	27	25	21	38	28	94	24	21	24	.....
14	.....	23	26	23	33	29	61	31	21	23	.....
15	.....	23	25	22	29	30	66	27	21	23	.....
						31	.....	25	22	.....	.....

Day.	July.	Aug.	Day.	July.	Aug.	Day.	July.	Aug.
1914.								
1	24.0	10.0	11	16.5	18.6	21	13.0	35.0
2	24.0	10.0	12	15.8	16.5	22	11.8	16.5
3	23.0	10.0	13	18.6	13.0	23	11.8	35.0
4	22.0	10.0	14	20.0	13.0	24	11.8	39.0
5	24.0	8.8	15	16.5	10.0	25	11.8	39.0
6	22.0	7.0	16	16.5	10.0	26	11.8	.....
7	20.0	10.0	17	15.8	43.0	27	11.8	.....
8	16.5	10.0	18	15.8	48.0	28	10.0	.....
9	16.5	16.5	19	15.8	43.0	29	10.0	.....
10	16.5	18.6	20	14.4	39.0	30	10.0	.....
						31	10.0	.....

a Interpolated.

Monthly discharge of North Fork of Milk River at Knight's ranch, Alta., 1909–10, 1913–14.

[Drainage area, 239 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1909.						
July 17–31	398	62	105	0.439	0.24	3,124
August	82	47	59	.247	.28	3,628
September	47	38	42	.176	.20	2,499
October	52	52	52	.218	.25	3,197
November 1–26	54	43	50	.209	.20	2,578
The period					1.17	15,026
1910.						
April 8–30	52.5	35.0	46.1	.193	.165	2,104
May	73.0	39.0	50.9	.213	.246	3,130
June	62.0	23.5	33.7	.141	.157	2,005
July	24.0	18.0	21.0	.088	.102	1,291
August	25.0	17.5	19.3	.081	.093	1,187
September	31.5	22.5	26.1	.109	.122	1,553
October	26.5	21.0	23.1	.096	.111	1,420
November 1–13	26.5	21.0	23.2	.097	.052	598
The period					1.048	13,288
1913						
June 26–30	94	45	68	1.41	.262	674
July	61	23	27	3.46	3.989	1,660
August	56	21	26	3.35	3.862	1,599
September	36	20	24	2.99	3.336	1,428
October 1–25	43	23	28	2.97	2.762	1,388
The period					14.211	6,749
1914.						
July	24	10.0	16.1	.067	.077	990
August 1–25	48	7.0	19.8	.083	.077	982
The period					.154	1,972

NORTH FORK OF MILK RIVER NEAR MACKIE'S RANCH, ALTA.

LOCATION.—In SW. ¼ sec. 19, T. 2, R. 18 W., fourth meridian, about 3 miles north of the Mackie ranch buildings, and a mile west of the junction of the North and South forks of Milk River.

DRAINAGE AREA.—435 square miles.

RECORDS AVAILABLE.—Open-water records July 8, 1909, to November 14, 1910; discharge measurements only 1911–1915. Station discontinued after 1915.

GAGE.—Vertical staff.

DISCHARGE MEASUREMENTS.—Made by wading or from cable.

CHANNEL AND CONTROL.—Bed of stream sandy. One channel at all stages but stream is likely to widely overflow both banks. Control not permanent.

EXTREMES OF STAGE.—1909–1915: Maximum stage recorded, 4 feet July 28, 1909 (discharge, 559 second-feet): minimum stage recorded, 1.47 feet August 6, 1914 (discharge, 7.6 second-feet).

ACCURACY.—Control fairly permanent while this station was being maintained. Rating curves fairly well defined. Records fair.

Discharge measurements of North Fork of Milk River near Mackie's ranch, Alta., 1910–1915.

Date.	Made by—	Gage height.	Discharge.
1910.		*Feet.*	*Sec.-ft.*
Apr. 7	L. J. Gleeson	2.17	58.6
14	do	2.19	58.1
19	do	2.05	52.2
28	do	2.02	45.1
May 3	do	2.06	53.2
12	do	2.24	69.9
17	do	2.18	67.2
26	do	2.03	47.4
31	do	1.94	29.7
June 9	do	2.27	82.3
15	do	1.87	30.3
23	do	1.84	27.2
29	do	1.80	20.7
July 7	do	1.77	21.6
22	F. H. Peters	1.75	17.4
30	do	1.72	17.8
Aug. 4	do	1.73	17.4
12	do	1.74	18.3
20	N. M. Sutherland	1.76	19.3
Sept. 11	do	1.905	32.5
17	do	1.83	26.7
25	do	1.90	32.0
29	do	1.91	34.5
Oct. 12	do	1.80	24.2
22	do	1.85	26.6
28	do	1.93	37.6
Nov. 4	do	1.76	20.6
14	do	1.74	14.8
1911.			
Apr. 19	L. J. Gleeson	2.16	73.57
May 4	do	2.01	56.96
12	do	1.95	47.60
21	J. E. Degnan	2.11	48.63
June 10	do	2.50	101.44
July 1	do	1.96	35.34
Aug. 3	do	1.94	35.56
29	do	1.92	32.14
Oct. 17	do	2.06	50.95
1912.		*Feet.*	*Sec.-ft.*
June 14	J. E. Degnan	1.95	37.62
25	do	1.84	22.27
July 11	do	2.10	56.57
Aug. 17	do	1.86	27.10
Oct. 14	do	2.00	43.30
1913.			
June 10	J. E. Degnan	1.97	49.0
28	do	2.30	94.0
July 19	do	1.73	26.0
Sept. 12	do	1.60	19.4
27	do	1.76	29.0
Oct. 17	do	1.77	28.0
Nov. 1	do	1.72	26.0
1914.			
May 6	J. E. Degnan	1.92	47.0
21	do	1.80	33.0
June 26	do	1.70	26.0
July 21	do	1.50	10.7
Aug. 6	do	1.47	7.6
23	do	1.57	13.5
Sept. 11	F. R. Steinberger	1.60	15.4
Oct. 14	J. E. Degnan	1.83	35.4
26	do	1.84	38.5
1915.			
Apr. 7	W. H. Storey	2.18	102
28	do	1.74	34
May 25	G. H. Whyte	1.88	46
June 21	W. H. Storey	2.44	134
July 18	do	2.52	151
Aug. 4	do	2.33	110
24	do	2.11	72
Sept. 9	do	2.17	86
29	do	2.18	87
Oct. 17	do	2.25	97

Daily discharge, in second-feet, of North Fork of Milk River at Mackie's ranch, Alta., 1909–10.

Day.	July.	Aug.	Sept.	Oct.	Nov.
1909.					
1	.....	190	45	55	60
2	.....	155	45	55	60
3	.....	131	45	55	60
4	.....	110	45	55	60
5	.....	91	45	55	60
6	.....	75	45	55	60
7	.....	60	45	55	60
8	110	52	45	55	60
9	104	52	45	55	60
10	98	52	45	55	60
11	91	52	45	55	60
12	85	52	45	55	.....
13	80	52	45	55	.....
14	75	52	45	55	.....
15	70	52	45	55	.....
16	69	52	45	55	.....
17	68	52	45	55	.....
18	67	52	45	55	.....
19	65	52	45	55	.....
20	65	52	45	55	.....
21	65	52	45	55	.....
22	65	52	45	55	.....
23	65	45	45	55	.....
24	65	45	45	55	.....
25	65	45	45	55	.....
26	65	45	45	55	.....
27	236	45	45	55	.....
28	559	45	45	55	.....
29	282	45	45	55	.....
30	268	45	45	55	.....
31	209	45	45	55	.....

Daily discharge, in second-feet, of North Fork of Milk River at Mackie's ranch, Alta., 1909–10—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1910.								
1	a 58.5	51.2	30.8	15.8	17.2	28.5	33.8	29.2
2	58.5	52.5	29.8	16.8	17.8	29.5	34.0	26.2
3	a 58.5	a 53.2	29.5	17.5	17.8	30.5	33.0	23.5
4	58.5	51.2	29.2	18.2	a 17.8	31.5	32.0	a 20.5
5	58.5	50.5	28.5	19.5	17.8	32.5	30.8	20.2
6	a 58.5	49.2	a 26.8	20.5	17.8	33.5	29.8	20.0
7	a 58.5	a 48.2	30.0	a 21.5	17.8	a 36.0	28.8	19.5
8	58.5	51.2	34.8	20.8	18.2	34.8	28.0	19.0
9	56.8	56.2	82.2	20.0	18.2	33.5	26.2	18.5
10	56.8	59.8	32.8	19.8	18.2	32.5	26.0	17.5
11	a 56.8	64.8	31.2	19.8	18.2	a 32.5	25.0	16.8
12	54.8	a 70.0	32.0	19.5	a 18.2	31.0	a 24.2	16.5
13	a 54.8	70.0	31.8	19.5	18.2	30.5	24.0	15.5
14	a 59.5	69.5	31.2	19.2	18.2	29.5	24.0	a 14.8
15	57.8	69.2	30.2	19.0	18.8	29.0	24.5	.....
16	56.2	69.0	30.2	a 18.8	18.8	28.2	25.0	.....
17	55.0	a 67.0	30.2	18.8	18.8	a 26.5	25.8	.....
18	53.5	64.8	a 30.2	18.5	19.5	26.5	26.5	.....
19	a 52.2	61.8	29.2	17.5	19.5	27.0	27.2	.....
20	51.5	59.0	29.8	17.8	a 19.5	28.0	26.8	.....
21	51.5	56.5	28.0	16.8	20.0	a 28.8	26.8	.....
22	51.2	53.5	28.0	a 15.8	20.8	29.2	a 26.5	.....
23	49.2	51.0	a 27.0	16.0	21.5	30.2	27.8	.....
24	48.8	a 48.8	25.0	16.2	22.0	30.8	29.5	.....
25	48.5	48.5	22.0	a 16.5	22.8	a 32.0	31.2	.....
26	a 48.5	a 47.5	19.5	17.0	23.5	32.5	31.8	.....
27	46.8	43.8	17.2	17.0	24.2	32.8	34.5	.....
28	a 45.0	41.0	a 15.2	17.2	25.0	34.2	a 37.5	.....
29	47.0	37.2	a 14.8	17.5	26.0	a 34.5	35.0	.....
30	49.0	33.8	15.0	17.8	26.8	34.8	33.2	.....
31	.....	a 29.8	.....	17.2	27.5	.....	30.8	.....

a Gage read; determinations for all other days interpolated.

Monthly discharge of North Fork of Milk River at Mackie's ranch, Alta., 1909–10.

[Drainage area, 435 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1909.						
July 8–31	559	65	125	0.287	0.26	5,949
August	190	45	64	.147	.17	3,935
September	45	45	45	.103	.11	2,678
October	55	55	55	.126	.15	3,382
November 1–11	60	60	60	.138	.06	1,309
The period	.....	.....	.....	.....	.75	17,253
1910.						
April	59.5	45.0	54.0	.124	.138	3,213
May	70.0	29.8	54.2	.125	.144	3,333
June	82.2	14.8	29.1	.067	.075	1,732
July	21.5	15.8	18.2	.042	.048	1,119
August	27.5	17.2	20.2	.046	.053	1,242
September	36.0	26.5	31.0	.071	.079	1,845
October	37.5	24.0	29.0	.067	.077	1,783
November 1–14	29.2	14.8	19.84	.046	.024	551
The period	.....	.....	.....	.....	.638	14,818

DEER CREEK AT DICKINSON'S RANCH, ALTA.

LOCATION.—In SW. ¼ sec. 15, T. 1, R. 12, W. fourth meridian.

DRAINAGE AREA.—7 square miles.

RECORDS AVAILABLE.—Incomplete records of open water flow, May 26, 1911, to November 7, 1911, and May 3, 1915, to October 31, 1915. Miscellaneous discharge measurements in 1912, 1913, 1914, and 1916. (See pp. 561–570.)

GAGE.—Vertical staff; read in 1915 by H. E. Sammons.

DISCHARGE MEASUREMENTS.—Made by wading; at high stages could be made from traffic bridge 200 feet above gage.

CHANNEL AND CONTROL.—Bed gravel with sand covering stones. Banks low, and subject to overflow; right bank covered with brush; left bank clean and covered with sand and gravel. Channel about 40 feet wide; in ordinary stages stream is 6 to 10 feet wide. One channel at all stages. Stage-discharge relation is subject to great change in high water but apparently constant in low water.

EXTREMES OF DISCHARGE.—1911 and 1915: Maximum stage recorded, 3 feet, June 24, 1911 (discharge, 127 second-feet); minimum stage recorded, 1.58 feet, June 18, 1911 (discharge, 0.40 second-foot).

DIVERSIONS.—There are several diversions for irrigation below this station.

ACCURACY.—Stage-discharge relation not permanent in 1915. Gage read once daily to hundredths. Two rating curves made because of shifting control, but 14 measurements were made and rating curves are well defined between gage heights 1.60 feet and 2 feet. Daily discharge determined directly from curves. Records for period good.

Discharge measurements of Deer Creek at Dickinson's ranch, Alta., 1911–1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1911.		*Feet.*	*Sec-ft.*	1912.		*Feet.*	*Sec.-ft.*
May 26	J. E. Degnan	1.75	2.67	Sept. 13	J. E. Degnan	1.12	0.62
June 6	do	1.75	2.55	28	do	1.18	1.24
26	do	2.34	20.82	Oct. 8	do	1.20	1.41
July 8	do	2.16	4.48	18	do	1.49	7.29
24	do	2.05	1.36	30	do	1.39	4.13
Aug. 11	do	2.19	6.30	Nov. 10	do	1.24	1.58
21	do	2.10	2.51	15	do	1.07	.26
Sept. 2	do	1.97	.54				
20	do	1.46	6.89	1915.			
Oct. 24	do	1.29	3.30	May 3	W. H. Storey	1.68	1.03
Nov. 6	do	1.22	2.56	20	do	2.00	8.35
				June 15	do	1.90	4.80
1912.				24	do	1.88	6.40
Apr. 26	J. E. Degnan	1.33	2.88	July 22	do	1.78	3.02
May 6	do	1.26	2.27	Aug. 8	do	1.75	2.06
20	do	1.22	1.61	18	do	1.67	1.21
29	do	1.27	2.63	26	do	1.64	.77
June 10	do	1.11	.39	Sept. 4	do	1.68	1.09
20	do	1.11	.70	16	do	1.67	1.11
28	do	1.06	.52	24	do	1.65	.83
July 3	do	1.11	.63	Oct. 5	do	1.71	1.37
18	do	1.16	.92	13	do	1.69	1.31
26	do	1.22	1.70	20	do	1.69	1.25
Aug. 6	do	1.22	1.74				
12	do	1.18	1.10	1916.			
21	do	1.15	.80	Mar. 10	L. J. Gleeson	2.41	7.9
29	do	1.13	.66				

Daily discharge, in second-feet, of Deer Creek at Dickinson's ranch, Alta, 1911, 1915.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1911.							
1	.....	4.20	50.5	1.60	0.70	5.00	.....
2	.....	3.60	39.0	11.50	.70	5.70	.....
3	.....	3.00	27.5	11.50	.....	6.80	.....
4	.....	3.00	16.0	11.50	.....	8.84	.....
5	.....	2.70	7.0	10.60	.....	10.50	.....
6	.....	2.10	4.75	11.50	.....	12.60	2.60
7	.....	1.80	4.30	12.40	.....	12.60	2.60
8	.....	1.20	3.85	13.30	.....	11.40	.....
9	.....	1.06	3.40	14.20	.....	10.50	.....
10	.....	.99	2.95	10.60	.....	9.68	.....
11	.....	.85	2.50	6.50	.....	.....	.....
12	.....	.78	2.35	6.10	.....	.....	.....
13	.....	.78	2.20	5.60	.....	.....	.....
14	.....	.71	1.90	5.20	.....	.....	.....
15	.....	.71	1.75	4.30	.....	.....	.....
16	.....	.57	1.75	2.95	.....	.....	.....
17	.....	.45	1.60	2.20	.....	.....	.....
18	.....	.40	1.90	1.90	.....	.....	.....
19	.....	.57	1.90	1.90	.....	.....	.....
20	.....	.57	1.75	2.20	6.30	5.92	.....
21	.....	.85	1.60	2.50	.....	.....	.....
22	.....	.99	1.75	1.30	.....	3.30	.....
23	.....	1.06	1.75	1.15	.....	3.30	.....
24	.....	127.00	1.75	1.15	.....	3.30	.....
25	.....	99.00	1.60	1.30	.....	.....	.....
26	2.70	21.30	1.60	1.15	.....	.....	.....
27	2.70	18.10	1.60	1.15	.....	.....	.....
28	3.30	16.00	1.75	.90	.....	.....	.....
29	3.60	11.50	1.00	.80	.....	.....	.....
30	5.60	4.75	1.75	.80	.....	.....	.....
31	5.60	.....	1.60	.70	.....	.....	.....

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1915.							1915.						
1	.....	1.82	4.50	4.00	0.52	0.83	16	6.50	6.90	2.80	1.14	1.07	1.14
2	.....	1.82	4.50	3.50	2.50	.91	17	6.50	6.90	4.50	1.14	1.07	1.14
3	1.14	34.00	4.50	3.00	2.20	1.14	18	8.30	7.20	4.50	1.07	1.07	1.14
4	1.22	51.00	4.00	3.00	1.69	1.14	19	8.30	6.50	4.00	1.07	1.14	1.14
5	1.14	38.00	3.70	2.70	1.30	1.40	20	8.30	6.90	3.50	1.14	1.07	1.22
6	1.07	30.00	3.40	2.00	1.14	1.14	21	6.50	7.20	3.50	1.07	.99	1.14
7	.99	9.10	3.40	2.00	.99	.99	22	4.70	7.20	3.40	.99	.99	1.14
8	.75	8.70	3.40	2.00	.99	.99	23	3.60	7.20	3.40	.91	.91	1.14
9	.52	8.30	3.40	1.82	1.30	.99	24	3.60	7.10	3.40	.91	.91	1.14
10	.52	7.20	3.20	1.69	1.30	1.40	25	2.60	10.20	3.00	.83	.91	1.07
11	.52	6.50	3.20	1.30	1.40	1.40	26	2.60	7.50	2.80	.83	.91	1.07
12	.60	6.50	3.20	1.30	1.40	1.30	27	1.69	6.30	2.80	.75	.91	1.07
13	2.10	6.50	3.50	1.30	1.40	1.30	28	1.69	5.50	2.70	.60	.91	1.07
14	2.10	6.50	3.50	1.14	1.07	1.22	29	1.82	4.70	6.30	.60	.91	.99
15	3.60	6.50	2.80	1.14	1.07	1.14	30	1.82	4.70	3.70	.52	.91	.91
							31	1.82	.....	3.70	.52	.....	.91

NOTE.—1911: Heavy rains in early part of September caused a larger run-off during that month than usual, but on Sept. 4 the gage was washed out and no observations were made during the high-water period. The gage was reestablished on Sept. 19, but the observer was away from home from Sept. 20 to Oct 1, and from Oct. 10 to Oct. 20, and no observations were made during his absence. Creek froze over Oct. 25. Opened Nov. 6 and 7 and froze up again on Nov. 8.

Monthly discharge of Deer Creek at Dickinson's ranch, Alta., 1911, 1915.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1911.						
May 26–31	5.6	2.7	3.92	0.653	0.15	47
June	127.0	.40	11.00	1.830	2.04	655
July	50.5	1.00	6.34	1.060	1.22	390
August	14.2	.70	5.17	.862	.99	318
September 1, 2, and 20	6.30	.70	2.57	.428	.05	15
October 1–10, 20, 22–24	12.6	3.30	7.80	1.300	.68	217
The period					5.13	1,642
1915.						
May 3–31	8.30	.52	3.00	.429	.46	172
June	51.00	1.82	10.80	1.543	1.72	643
July	6.30	2.70	3.60	.514	.59	221
August	4.00	.52	1.48	.211	.24	91
September	2.50	.52	1.17	.167	.19	70
October	1.40	.83	1.13	.161	.19	69
The period					3.39	1,266

DEER CREEK AT DEER CREEK CATTLE CO.'S RANCH, ALTA.

LOCATION.—In NE. ¼ sec. 26, T. 1, R. 12 W. fourth meridian, about a mile upstream from Deer Creek Cattle Co.'s ranch buildings, three-quarters of a mile above their dam and intake, and 3 miles below Dickinson Bros.'s dam and intake.

DRAINAGE AREA.—13 square miles.

RECORDS AVAILABLE.—May 27 to Oct. 28, 1911.

GAGE.—Vertical staff on right bank; graduated to feet and hundredths. Read by H. Webster.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed consists of gravel and sand. Right bank composed of sandy loam and is subject to overflow during high water for about 40 feet from the bank; left bank sandy loam, high, slopes gradually, and is not subject to overflow. Stage-discharge relation likely to change greatly in high water, but apparently remains constant during low water.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 2.56 feet June 25, 1911 (discharge estimated at 44.90 second-feet); minimum stage recorded, 1.48 feet June 15–20 (discharge 0.10 second-foot).

ICE.—No winter records.

DIVERSIONS.—Water is diverted from Deer Creek above this station for irrigation on Dickinson Bros.'s ranch.

ACCURACY.—Records, fair.

Discharge measurements of Deer Creek at Deer Creek Cattle Co.'s ranch, Alta, 1911.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec-ft.*			*Feet.*	*Sec.-ft.*
May 27	J. E. Degnan	1.710	2.11	Aug. 21	J. E. Degnan	2.030	1.74
June 25	do	2.560	44.87	Sept. 20	do	2.560	5.91
July 8	do	2.140	4.54	Oct. 25	do	2.495	3.53
24	do	1.940	0.74	Nov. 6	do	2.420	1.61

Daily discharge, in second-feet, of Deer Creek at Deer Creek Cattle Co.'s ranch, Alta., 1911.

Day.	May.	June.	July.	Sept.	Oct.	Day.	May.	June.	July.	Sept.	Oct.
1	.....	5.50	.....	.....	6.40	16	.....	0.10	1.60	.....	.....
2	.....	4.80	.....	.....	7.10	17	.....	0.10	1.40	.....	.....
3	.....	3.00	.....	.....	7.10	18	.....	0.10	1.30	.....	.....
4	.....	3.00	.....	.....	.....	19	.....	0.10	1.10	.....	.....
5	.....	2.80	.....	.....	.....	20	.....	0.10	1.00	6.00	.....
6	.....	2.30	.....	.....	.....	21	.....	0.30	0.70	5.60	.....
7	.....	1.30	(b)	.....	.....	22	.....	2.30	0.70	6.80	.....
8	.....	1.30	4.20	.....	.....	23	.....	2.30	1.90	7.10	.....
9	.....	0.50	1.60	.....	.....	24	.....	.....	0.90	7.10	.....
10	.....	0.50	1.60	.....	.....	25	.....	a44.90	1.00	6.80	3.80
11	.....	0.50	1.40	.....	.....	26	.....	(b)	1.10	6.80	3.00
12	.....	0.50	1.40	.....	.....	27	3.00	.....	1.30	6.00	3.80
13	.....	0.40	1.40	.....	.....	28	3.80	.....	1.00	5.60	4.50
14	.....	0.20	1.60	.....	.....	29	3.80	.....	0.90	6.00	.....
15	.....	0.10	1.70	.....	.....	30	6.10	.....	0.90	6.00	.....
						31	6.80	.....	0.70	.....	.....

a Discharge estimated. b Gage washed out June 26 replaced July 7.

Monthly discharge of Deer Creek at Deer Creek Cattle Co.'s ranch, Alta., 1911.

[Drainage area, 13 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
May 27-31	6.8	3.0	4.70	0.362	0.07	47
June 1-23 and 25	44.9	.10	3.21	.247	.22	153
July 8-31	4.2	.70	1.35	.104	.09	64
September 20-30	7.1	5.6	6.3	.488	.20	138
October 1-3, 25-28	7.1	3.0	5.1	.395	.10	71
The period	.....	.....	.....	.....	.68	473

Seepage measurements on Deer Creek, 1913.

[Made by J. E. Degnan.]

Date.	Location.				Discharge.	Date.	Location.				Discharge.
	Quarter.	Sec.	T.	R.			Quarter.	Sec.	T.	R.	
					Sec.-ft.						*Sec.-ft.*
June 13-14	SW	36	1	12	0.43	July 11	NE	26	1	12	1.00
13-14	SE	35	1	12	.77	11	SW	26	1	12	1.31
13-14	NE	26	1	12	.61	11	NE	22	1	12	.88
13-14	SW	26	1	12	.55	11	NW	15	1	12	1.08
13-14	NE	22	1	12	.76	11	SW	15	1	12	.86
13-14	SW	22	1	12	.88	Aug. 29	SW	36	1	12	.032
13-14	NW	15	1	12	.95	29	NE	26	1	12	.099
13-14	SW	15	1	12	.92	29	SW	26	1	12	.309
July 3	SW	36	1	12	1.40	29	SW	22	1	12	.348
3	SE	35	1	12	1.50	29	NW	15	1	12	.443
3	NE	26	1	12	1.46	29	SW	15	1	12	.499
3	SW	26	1	12	1.51	Oct. 2	SW	36	1	12	0
7	NE	22	1	12	1.20	2	NW	26	1	12	0
7	SW	22	1	12	1.24	2	SW	26	1	12	.049
7	NW	15	1	12	1.42	2	SW	22	1	12	.068
7	SW	15	1	12	1.47	2	SW	15	1	12	.192
11	SW	36	1	12	.52	21	SW	36	1	12	.420
11	SE	35	1	12	.98	21	SW	15	1	12	.698

NOTE.—Range numbers are all west of the fourth meridian.

LODGE CREEK AT HARTT'S RANCH, ALTA.

LOCATION.—In NW. ¼ sec. 10, T. 6, R. 3 W. fourth meridian, about a mile below junction of east branch and 800 feet downstream from original site just north of road allowance between sec. 10 and sec. 15, T. 6, R. 3 W. fourth meridian, from which it was moved June 22, 1912.

DRAINAGE AREA.—74 square miles.

RECORDS AVAILABLE.—Open-water records, April 25, 1911, to June 8, 1915, when station was discontinued.

GAGE.—Vertical staff; read by Mrs. Clara Hartt.

DISCHARGE MEASUREMENTS.—Made by wading or with weir.

CHANNEL AND CONTROL.—Banks high, steep, and not subject to overflow; covered with dense growth of willow brush. Bed, soft clay; one channel at all stages; does not shift. Control affected by beaver dams.

EXTREMES OF DISCHARGE.—1910–1915: Maximum stage recorded, 11.00 feet, April 5, 1912 (discharge, 1,195 second-feet); no flow at various periods.

ICE.—Observations discontinued during winter seasons.

DIVERSIONS.—There are a number of authorized irrigation projects on this stream and its tributaries above this station.

ACCURACY.—Stage-discharge relation permanent. Gage read once daily to hundredths. Rating curves well defined. Records considered good.

Discharge measurements of Lodge Creek at Hartt's ranch, Alta., 1911–1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1911.		*Feet.*	*Sec.-ft.*	1913.		*Feet.*	*Sec.-ft.*
Apr. 25	M. H. French	3.06	22.51	Sept. 21	H. D. St. A. Smith	.....	0
May 22	....do	1.35	3.51	Oct. 14	....do	.....	0
Oct. 5	....do	.2.02	3.22	Nov. 7	....do	.....	0
1912.				1914.			
May 20	G. R. Elliott	1.35	5.50	Apr. 16	H. R. Carscallen	5.04	42.00
June 22	....do	.45	.22	May 18	H. W. Rowley	1.66	.98
July 26	....do	.....	0	June 16	....do	1.59	.65
Aug. 27	....do	.....	0	July 6	....do	0	0
Oct. 1	....do	.....	0	30	....do	0	0
Nov. 2	....do	.....	0	Aug. 25	....do	0	0
				Sept. 25	....do	0	0
1913.				Oct. 21	....do	1.85	.32
Apr. 20	H. D. St. A. Smith	6.30	81.70				
May 10	....do	3.25	10.00	1915.			
June 13	....do	2.40	1.07	June 8	H. W. Rowley	2.96	8.2
July 10	....do	.....	.....	Oct. 6	....do	.65	0
Aug. 1	....do	.....	0	Oct. 29	....do	.67	0
Sept. 1	....do	.....	0				

Daily discharge, in second-feet, of Lodge Creek at Hartt's ranch, Alta., 1911–1915.

Day.	Apr.	May.	June.	July.	Sept.	Oct.	Nov.
1911.							
1	.....	14.0	2.2	55.0	0	2.0	2.0
2	.....	16.0	2.2	54.0	0	1.2	2.0
3	.....	20.0	2.3	21.0	0	1.3	2.0
4	.....	23.0	1.7	10.0	39.0	4.0	.....
5	.....	19.0	.7	9.0	91.0	3.4	.....
6	.....	8.2	.3	7.0	51.0	1.7	.....
7	.....	7.8	0	4.1	10.0	1.6	.....
8	.....	6.0	0	3.5	8.5	1.3	.....
9	.....	5.4	0	4.1	4.5	1.1	.....
10	.....	5.4	0	4.4	2.3	1.3	.....
11	.....	7.1	0	3.8	1.7	1.5	.....
12	.....	7.0	0	2.6	1.0	1.5	.....
13	.....	5.8	0	2.3	1.0	1.5	.....
14	.....	5.8	0	2.0	.5	1.5	.....
15	.....	6.7	0	1.6	.2	1.5	.....
16	.....	14.0	0	1.5	.1	1.6	.....
17	.....	16.0	0	.5	.4	1.6	.....
18	.....	8.4	0	.1	.6	1.8	.....
19	.....	6.4	0	0	.7	1.7	.....
20	.....	8.0	0	0	1.8	2.6	.....
21	.....	5.8	1.5	0	1.6	2.6	.....
22	.....	3.8	144.0	0	1.2	3.2	.....
23	.....	7.5	17.0	0	1.0	4.7	.....
24	.....	18.0	18.0	0	1.2	3.2	.....
25	41.0	5.8	98.0	0	1.8	2.6	.....
26	22.0	8.4	48.0	0	2.0	2.3	.....
27	14.0	6.5	22.0	0	2.2	2.3	.....
28	8.5	5.9	10.0	0	2.4	2.2	.....
29	8.3	3.8	9.0	0	2.0	2.2	.....
30	11.0	2.6	7.0	0	1.8	2.1	.....
31	.....	2.6	.....	0	.....	2.0	.....

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1912.					1913.				
1	.....	20.30	9.27	0.06	1	32.0	8.70	1.07	0.90
2	.....	19.48	7.46	.04	2	13.3	11.60	.90	.90
3	.....	15.13	6.22	.02	3	9.3	11.60	.84	1.20
4	.....	14.50	5.17	.02	4	19.6	9.60	.78	1.20
5	1,195.00	13.90	4.54	.....	5	33.0	9.30	.78	1.07
6	323.00	50.74	3.49	.....	6	145.0	7.40	.73	.90
7	565.00	44.18	3.28	.....	7	165.0	10.00	.52	.90
8	713.00	21.18	3.14	.....	8	186.0	10.80	.52	.39
9	710.00	12.00	2.79	.....	9	204.0	9.10	.48	.19
10	550.00	11.50	2.24	.....	10	195.0	12.40	.26	.....
11	256.00	11.00	1.82	.....	11	194.0	18.70	.19	.....
12	88.00	10.35	1.30	.....	12	236.0	15.50	.12	
13	53.88	9.18	1.25	.....	13	182.0	22.00	1.07	.....
14	71.08	9.00	.46	.....	14	164.0	44.00	1.07	
15	88.00	8.73	3.14	.....	15	132.0	44.00	.30	
16	97.00	8.46	4.82	.....	16	109.0	43.00	0.19	.....
17	74.82	8.19	2.79	.....	17	76.0	16.40	.10	.....
18	66.00	7.06	2.30	.....	18	78.0	15.00	0	.....
19	53.88	6.29	1.88	.....	19	81.0	9.50	0	.....
20	41.92	5.87	.86	.....	20	93.0	8.70	0	.....
21	57.12	5.59	.61	.....	21	49.0	8.00	0	.....
22	74.82	5.31	.22	.....	22	46.0	5.60	.05	.....
23	63.90	5.10	.20	.....	23	44.0	3.00	.62	.....
24	51.98	5.24	.18	.....	24	15.0	4.00	.95	.....
25	28.76	5.24	.16	.....	25	13.3	3.00	1.62	.....
26	24.90	4.89	.22	.....	26	13.0	2.60	.62	.....
27	19.34	205.00	.10	.....	27	14.2	2.40	2.90	.....
28	20.30	165.00	.08	.....	28	22.0	2.20	4.20	.....
29	21.74	23.02	.08	.....	29	17.0	1.76	3.20	.....
30	20.90	12.50	.06	.....	30	13.3	1.54	1.92	.....
31	.....	12.50	.....	.....	31	.....	1.27	.....	.....

Daily discharge, in second-feet, of Lodge Creek at Hartt's ranch, Alta., 1911–1915—Continued.

Day.	Mar.	Apr.	May.	June.	Oct.	Day.	Mar.	Apr.	May.	June.	Oct.
1914.						1914.					
1	.....	15.6	*a* 1.55	0	0	16	62.00	45.0	1.59	0.48	1.29
2	.....	93.0	*a* 1.55	0	0	17	35.00	47.0	1.21	.32	1.98
3	.....	77.0	*a* 1.55	0.32	0	18	17.60	37.0	1.02	.32	1.40
4	.....	100.0	1.55	.84	0	19	9.40	22.0	.48	.32	1.59
5	.....	140.0	3.10	.88	0	20	9.40	12.3	.48	.08	.66
6	.....	115.0	2.80	3.70	.18	21	9.40	*a* 10.7	.48	0	.32
7	.....	45.0	3.70	1.98	13.80	22	9.40	9.4	.48	0	0
8	.....	46.0	4.70	1.98	13.80	23	9.40	11.0	.48	0	0
9	.....	38.0	19.80	1.78	1.78	24	9.40	12.1	.42	0	0
10	.....	39.0	19.40	3.70	.84	25	9.40	8.4	.42	0	0
11	.....	34.0	9.40	3.40	.08	26	9.40	5.00	.32	0	0
12	.....	56.0	5.00	.66	.02	27	9.40	4.30	0	0	0
13	.....	63.0	2.80	2.80	0	28	9.40	1.55	0	0	0
14	95.00	61.0	2.38	1.21	0	29	9.40	1.55	0	0	0
15	134.00	58.0	1.78	.62	0	30	9.40	1.55	0	0	0
						31	13.80	.....	0	.....	0

Day.	Mar.	Apr.	May.	June.	Day.	Mar.	Apr.	May.	June.
1915.					1915.				
1	.....	40.00	1.78	1.78	16	.....	11.50	10.40	.....
2	.....	304.00	1.78	2.84	17	.....	9.90	7.90	.....
3	.....	232.00	1.78	4.60	18	.....	8.90	6.50	.....
4	.....	200.00	1.78	138.00	19	.....	8.90	6.10	.....
5	.....	120.00	1.78	100.00	20	.....	7.40	4.30	.....
6	.....	64.00	1.78	68.00	21	4.60	4.90	2.60	.....
7	.....	28.00	1.78	12.60	22	16.30	4.60	2.40	.....
8	.....	26.00	1.78	9.00	23	82.00	4.40	2.30	.....
9	.....	21.00	1.78	.....	24	156.00	4.30	2.20	.....
10	.....	19.80	1.78	.....	25	62.00	3.70	1.98	.....
11	.....	17.60	1.78	.....	26	26.00	3.60	1.90	.....
12	.....	15.60	1.78	.....	27	35.00	3.20	1.78	.....
13	.....	15.60	1.59	.....	28	34.00	2.60	1.67	.....
14	.....	15.60	1.78	.....	29	24.00	2.20	1.67	.....
15	.....	13.80	2.90	.....	30	19.00	1.98	1.59	.....
					31	17.60	.....	1.59	.....

a Estimated.

NOTE.—1911: No flow June 7–20 and July 19 to Sept. 3.
1912: Ice present Apr. 1–4. Gage rod moved to new position June 22; discharge June 22 to July 5 estimated from old rod. No flow from July 5 to end of year.
1913: No flow after July 9.
1914: No flow May 27 to June 2, June 21–30, during July, August, and September; Oct. 1–5, 13–15, and 22–31. Control shifting Oct. 6–21.
1915: Rating curve for 1914 used to determine discharge.

Monthly discharge of Lodge Creek at Hartt's ranch, Alta., 1911–1915.

[Drainage area, 74 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1911.						
April 25–30	41.0	8.3	17.47	0.224	0.050	208
May	23.0	2.6	9.06	.116	.134	557
June	144.0	.0	12.80	.164	.183	762
July	55.0	.0	6.05	.078	.090	372
August	.0	.0	.00	.000	.000	00
September	91.0	.1	7.71	.099	.110	459
October	4.7	1.1	2.10	.027	.031	129
November 1–3	2.0	2.0	2.00	.026	.003	12
The period	.....	.....	.....	.....	.601	2,499

Monthly discharge of Lodge Creek at Hartt's ranch, Alta., 1911–1915—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1912.						
April 5–30	1,195.00	19.34	205.01	2.63	2.55	10,572
May	205.00	4.89	24.39	.31	.36	1,500
June	9.27	9.27	2.30	.03	.03	139
July	.06	.00	.004			0.3
The period					2.94	12,211.3
1913.						
April	236.00	9.30	87.10	1.120	1.25	5,183
May	44.00	1.27	12.00	.154	.18	738
June	4.20	.00	.87	.011	.01	52
July	1.20	.00	.25	.003	.00	15
The period					1.44	5,988
1914.						
March 14–31	134.0	9.40	26.00	.325	.22	932
April	140.0	1.55	40.00	.500	.56	2,380
May	19.8	.00	2.80	.035	.04	172
June	3.7	.00	.83	.010	.01	49
October	13.8	.00	1.22	.015	.02	75
The period					.85	3,608
1915.						
March 21–31	156.00	4.60	43.00	.5380	.22	944
April	304.00	1.98	40.00	.5000	.56	2,380
May	10.40	1.59	2.70	.0338	.04	166
June 1–8	138.00	1.78	42.00	.5250	.16	668
The period					.98	4,158

Mean monthly discharge, in second-feet, of Lodge Creek at Hartt's ranch. Alta., 1911–1915.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total in acre-feet.
1911	.....	[a] 17.5	9.1	12.80	6.00	0	7.7	2.10	[a] 2.0	[a] 2,499
1912	.....	[b] 205.0	24.0	2.30	0	0	0	0	.....	13,837
1913	.....	87.0	12.0	.87	.25	0	0	0	.....	5,988
1914	[a]26.0	40.0	2.8	.83	0	0	0	[c]1.22	.....	3,608
1915	[d]15.3	40.0	2.7	[a] 42.00	.....	.....	.....	.....	.....	[a] 4,158
Average	15.3	93	10.1	4.2	1.56	0	1.92	.83	.....	7,811
Average run-off, acre-feet	941	5,534	621	250	96	0	114	51	.....	7,607
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	103

[a] Incomplete record, not included in average.
[b] Average for part of month assumed as monthly average.
[c] Records published in report for 1914 have been revised.
[d] Reduced to monthly average.

LODGE CREEK AT HESTER'S RANCH, ALTA.

LOCATION.—In NE. ¼ sec. 25, T. 3, R. 1 W. fourth meridian, at Hester's ranch, to which it was moved April 29, 1914, from NE. ¼ sec. 36, T. 3, R. 1 W. fourth meridian.

DRAINAGE AREA.—224 square miles.

RECORDS AVAILABLE.—Records of open-water flow August 31, 1912, to October 31, 1914.

GAGE.—Vertical staff; read by Marcia Hester.

DISCHARGE MEASUREMENTS.—Made by wading or with weir.

CHANNEL AND CONTROL.—Bed gravel and clay; not likely to shift. Right bank fairly high, covered with willows and rose brush, and not subject to overflow except in extreme flood stage; left bank high, covered with rose and buck brush, and not subject to overflow. One channel at all stages. Control consists of beaver dams; likely to change.

EXTREMES OF DISCHARGE.—1912–1914: Maximum stage recorded, 3.40 feet, April 6, 1914 (discharge, 148 second-feet); no flow at various periods.

ICE.—Observations discontinued during winter.

DIVERSIONS.—James Mitchell uses water for irrigation between this station and station at Hartt's ranch.

ACCURACY.—Stage-discharge relation permanent. Gage read once daily to hundredths. Rating curves fairly well defined. Records considered good, except those for higher stages, which are poor.

Discharge measurements of Lodge Creek at Hester's ranch, Alta., 1913–14.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1913.		*Feet.*	*Sec.-ft.*	1914.		*Feet.*	*Sec.-ft.*
Apr. 22	H. D. St. A. Smith	2.45	81.50	Apr. 29	H. W. Rowley	1.76	7.10
May 12	do	.92	11.37	June 17	do	1.51	2.40
June 14	do	.30	.....	July 15	do	1.20	0
July 11	do	.32	.08	Aug. 26	do	Dry.	0
Aug. 1	do	.31	.....	Sept. 26	do	Dry.	0
28	do	.....	0	Oct. 24	do	1.21	0
Sept. 20	do	.....	.....				
28	do	.....	.....				
Oct. 13	do	.....	.....				
Nov. 5	do	.....	.....				

Daily discharge, in second-feet, of Lodge Creek at Hester's ranch, Alberta., 1913–14.

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1913.					1913.				
1	.....	21.0	4.60	10.50	16	.....	35.0	0.07	0.50
2	.....	15.0	1.55	8.10	17	.....	27.0	.07	.50
3	.....	14.2	1.55	6.10	18	.....	27.0	.07	.25
4	.....	13.8	1.55	6.10	19	.....	19.6	.07	.25
5	.....	13.8	1.55	4.10	20	.....	13.8	.07	.00
6	.....	13.8	1.55	2.40	21	.....	13.8	.07	.00
7	.....	13.8	.50	2.40	22	82	8.6	.07	17.30
8	.....	13.8	.50	1.30	23	30	8.6	.07	2.40
9	.....	13.8	.50	1.30	24	30	8.6	.07	.60
10	.....	13.8	.50	1.30	25	30	4.6	.07	0
11	.....	13.8	.50	.50	26	22	4.6	.07	0
12	.....	19.6	1.55	.50	27	22	4.6	.07	0
13	.....	19.6	1.55	.60	28	16	4.6	2.40	0
14	.....	19.6	.07	.60	29	16	4.6	2.40	0
15	.....	27.0	.07	.55	30	30	4.6	10.50	0
					31	.....	4.6	.....	0

Day.	Mar.	Apr.	May.	June.	July.	Oct.	Day.	Mar.	Apr.	May.	June.	July.	Oct.
1914.							1914.						
1	.....	106.0	4.80	0	0.10	0	16	14.5	128.0	4.20	12.50	0	3.70
2	.....	72.0	4.80	0	.10	0	17	14.5	119.0	2.20	1.84	0	2.20
3	.....	88.0	3.70	0	.08	0	18	58.0	52.0	2.10	.70	0	1.10
4	.....	102.0	4.10	0	.08	0	19	56.0	42.0	1.60	.18	0	.30
5	.....	120.0	4.20	0	.08	0	20	52.0	34.0	.70	.10	0	.22
6	.....	148.0	3.70	0	.06	0	21	21.0	29.0	.46	0	0	.08
7	.....	120.0	3.90	0	.06	0	22	6.0	22.0	.30	0	0	.04
8	.....	85.0	3.90	0	.06	0	23	0	22.0	.30	0	0	.02
9	.....	65.0	4.60	0	.04	29.00	24	0	20.0	.22	0	0	.02
10	.....	53.0	7.10	0	.04	26.00	25	0	18.5	.14	0	0	0
11	.....	40.0	9.40	0	.02	15.90	26	0	10.2	.10	0	0	0
12	.....	23.0	21.00	0	.02	13.30	27	0	7.0	.02	0	0	0
13	.....	46.0	22.00	0.78	.02	12.00	28	0	6.0	0	0	0	0
14	.....	127.0	22.00	1.60	0	8.10	29	0	7.1	0	.02	0	0
15	.....	132.0	4.60	15.90	0	6.80	30	0	7.1	0	.10	0	0
							31	48.0	.....	0	.....	0	0

NOTE.—No flow in 1912 after the station was established, Aug. 31.
1913: No flow July 25–31.
1914: Discharge Mar. 16 to Apr. 28 determined from gage heights at upper station in NE. ¼ sec. 36, T. 3, R. 1 W. fourth meridian. No flow Mar. 23–30, May 28 to June 12, June 21–28, July 14 to Oct. 8, and Oct. 25–31.

Monthly discharge of Lodge Creek at Hester's ranch, Alta., 1913–14.

[Drainage area, 224 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1913.						
April 22–30	82.00	16.00	31.00	0.151	0.050	554
May	35.00	4.60	14.20	.069	.080	873
June	10.50	.07	1.14	.006	.007	68
July	17.30	.00	2.20	.011	.013	135
The period					.150	1,630
1914.						
March 16–31	58.00	.00	16.90	.0760	.0450	535
April	148.00	6.00	62.00	.2780	.3100	3,689
May	22.00	.00	4.40	.1970	.0230	270
June	15.90	.00	1.13	.0050	.0060	67
July	.10	.00	.02	.0001	.0001	2
October	29.00	.00	3.80	.0170	.0200	236
The period					.4000	4,799

NOTE.—Area used in these tables is the same as published in the Canadian hydrometric reports, which was changed from time to time as more definite information of the drainage basin was obtained.

LODGE CREEK AT INTERNATIONAL BOUNDARY.

LOCATION.—In the SE. ¼ sec. 12, T. 1, R. 29 W. third meridian, at Willow Creek Royal Northwestern Mounted Police barracks, a mile north of the international boundary, in Saskatchewan, 36 miles north of Havre, Mont.

DRAINAGE AREA.—806 square miles (measured by engineers of the Reclamation Service, Department of the Interior, Canada.).

RECORDS AVAILABLE.—Open-water records April 25, 1910, to December 31, 1917. Records April 25 to May 14, 1910, incomplete; after March 17, 1911, complete. Winter flow very small. From April 25, 1910, to October 31, 1916, station was maintained by Irrigation Branch, Department of Interior, Canada; cooperative after April 1, 1917.

GAGE.—Inclined staff. Read by A. R. Price and W. G. Edgenton.

DISCHARGE MEASUREMENTS.—Made from cable or by wading. Some low-water measurements made with weir.

CHANNEL AND CONTROL.—Bed composed of heavy boulders, gravel, and sand. Banks steep and not subject to overflow. One channel at all stages. Control is natural gravel bar; changes during flood stages.

EXTREMES OF DISCHARGE.—1910–1917: Maximum stage recorded, 11.48 feet April 5, 1912 (discharge, 5,700 second-feet); no flow at various periods. (See hydrograph, Pl. XXII.)

ICE.—Observations discontinued during the winter. Stage-discharge relation affected by ice during period of spring break up.

DIVERSIONS.—There are several authorized irrigation projects on this stream and its tributaries above this station.

ACCURACY.—Rating curves well defined. Records good.

COOPERATION.—Station maintained jointly by United States Geological Survey and Reclamation Service, Department of Interior, Canada, since April 1, 1917.

Discharge measurements of Lodge Creek at international boundary, 1910–1917.

Date.	Made by—	Gage height.	Discharge.
1910.		*Feet.*	*Sec.-ft.*
Apr. 25	N. M. Sutherland	0.94	6.91
May 9	do	.685	.30
12	do	.65	.24
18	F. H. Peters	9.34	.15
June 13	H. R. Carscallen		0
1911.			
Apr. 19	M. H. French	2.93	107.70
May 12	do	1.65	7.96
June 6	do	1.41	1.73
July 8	do	2.04	26.66
Aug. 7	do	1.05	0
Sept. 18	do	1.75	12.42
1912.			
Apr. 16	M. H. French	4.44	366.90
17	do	3.75	227.30
May 25	G. R. Elliott	1.73	11.23
June 28	do	1.31	1.09
Aug. 5	do	.83	0
30	do	.73	0
Oct. 11	do	.97	0
Nov. 9	do	1.00	0
1913.			
Apr. 23	H. D. St. A. Smith	3.08	134.00
May 14	do	1.86	19.00
June 16	do	1.21	.18
July 12	do	1.26	1.14
Aug. 9	do	1.10	.05
Sept. 9	do		
Oct. 11	do		
Nov. 3	do		
1914.			
Mar. 16	H. D. St. A. Smith	5.25	559.00
18	do	3.73	204.00
21	do	2.73	64.00
30	do	1.68	12.70
Apr. 1	do	1.93	17.20
3	do	3.88	225.00
6	do	3.89	220.00
7	do	4.53	363.00
30	H. W. Rowley	2.05	20.00
May 21	do	1.47	2.60
23	do	1.40	2.10
June 18	do	1.00	0
July 13	do	Dry.	0
Aug. 10	do	Dry.	0
27	do	Dry.	0
Sept. 23	do	Dry.	0
Oct. 26	do	1.25	.66
31	do	1.18	.31
1915.		*Feet.*	*Sec.-ft.*
Mar. 25	H. W. Rowley	8.37	553.00
29	do	8.10	447.00
Apr. 1	do	6.57	957.00
5	do	7.00	1,266.00
10	do	3.01	126.00
23	do	1.76	15.50
May 22	do	1.44	2.20
June 23	do	1.46	2.20
July 16	do	4.66	270.00
18	do	5.00	483.00
Aug. 13	do	1.19	.16
Sept. 2	do	1.55	5.30
25	do	1.25	.40
Oct. 22	do	1.29	.40
1916.			
Mar. 27	H. W. Rowley	5.55	640.00
30	do	4.10	302.00
Apr. 3	do	2.74	102.00
8	do	2.25	53.00
10	do	2.20	48.00
14	do	2.67	98.00
May 1	do	1.74	13.60
13	do	1.63	6.40
June 3	do	3.40	151.00
6	do	2.26	55.00
30	do	4.00	252.00
July 4	do	8.00	1,527.00
4	do	7.85	1,444.00
5	do	5.65	688.00
22	do	2.48	66.00
26	do	1.92	25.00
Aug. 15	do	1.85	18.70
Sept. 2	do	1.35	[a].58
9	do	2.04	31.00
29	Newhall and Rowley	1.30	[a].34
Oct. 30	H. W. Rowley	1.53	3.80
1917.			
Apr. 7	G. S. Wenden	5.30	283.0
17	do	6.42	974.0
27	do	4.32	368.0
30	do	3.85	233.0
May 4	Anderson and Tuttle	4.35	358.0
8	G. S. Wenden	4.82	453.0
15	do	4.20	317.0
17	do	3.73	174.0
24	A. H. Tuttle	2.35	63.0
25	G. S. Wenden	2.28	65.0
30	do	2.04	29.0
June 7	A. H. Tuttle	1.82	17.5
20	do	1.56	6.9
22	P. A. Fetterly	1.50	5.7
July 28	do	.70	0
Sept. 25	do	Dry.	0
Nov. 14	do	Dry.	0

[a] Measurement made with sharp-crested rectangular weir.

NOTE.—A. H. Tuttle is engineer, employed by the United States Geological Survey.

Daily discharge, in second-feet, of Lodge Creek at international boundary, 1910–1917.

Day.	Apr.	May.	Day.	Apr.	May.	Day.	Apr.	May.
1910.			1910.			1910.		
1		4.34	11		0.25	21		
2		3.60	12		.24	22		
3		3.96	13		.20	23		
4		2.60	14		.17	24		
5		2.05	15			25	6.91	
6		.86	16			26	6.91	
7		.60	17			27	6.91	
8		.37	18			28	6.47	
9		.23	19			29	6.02	
10		.26	20			30	5.15	
						31		

Daily discharge, in second-feet, of Lodge Creek at international boundary, 1910–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Sept.	Oct.	Nov.
1911.								
1	.....	377	37.0	2.8	46.0	0.0	4.0	1.0
2	.....	345	38.0	3.6	40.0	.0	3.6	1.0
3	.....	321	59.0	2.8	46.0	.0	3.2	1.0
4	.....	207	48.0	2.2	321.0	.0	3.0	1.2
5	.....	144	38.0	1.7	133.0	17.0	3.0	1.2
6	.....	103	36.0	1.8	84.0	1,550.0	2.8	1.2
7	.....	101	30.0	2.4	30.0	1,830.0	2.8	1.3
8	.....	101	29.0	2.4	37.0	918.0	2.6	1.3
9	.....	93	26.0	2.0	20.0	249.0	2.6	1.4
10	.....	75	29.0	2.0	21.0	134.0	2.4	1.5
11	.....	68	11.0	1.8	11.0	76.0	2.0	1.5
12	.....	63	11.0	1.4	13.0	47.0	1.9	1.4
13	.....	61	7.4	1.3	11.0	41.0	1.7	1.4
14	.....	80	7.4	1.0	6.7	26.0	1.5	1.4
15	.....	149	6.1	1.0	6.4	22.0	1.5	1.4
16	.....	110	7.4	1.2	6.1	17.0	1.4	.....
17	0.0	101	7.4	1.0	5.5	17.0	1.4	.....
18	4.0	113	5.5	1.0	4.3	13.0	1.3	.....
19	.5	127	4.6	1.0	4.0	11.0	1.3	.....
20	.0	38	3.2	1.0	3.2	8.6	1.2	.....
21	.0	37	4.0	1.0	1.9	6.1	1.2	.....
22	2.4	46	4.0	1.0	.8	7.0	1.1	.....
23	4.6	48	3.8	.9	.5	7.8	1.0	.....
24	13.0	46	3.8	70.0	0	5.8	1.0	.....
25	4.9	66	4.6	80.0	.....	5.5	1.0	.....
26	24.4	40	4.0	54.0	.....	5.2	1.0	.....
27	37.0	34	3.6	44.0	.....	5.2	1.0	.....
28	37.0	34	4.0	59.0	.....	5.2	1.0	.....
29	[a] 684.0	34	4.6	92.0	.....	4.9	1.0	.....
30	[a] 660.0	34	4.0	57.0	.....	4.3	1.0	.....
31	[a] 644.0	.....	4.6	.....	.....	.....	1.0	.....

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.	Aug.
1912.					1913.					
1	.....	49.82	35.30	1.30	1	88	27.0	7.00	1.18	1.81
2	.....	51.46	25.55	1.20	2	82	27.0	3.10	1.18	1.28
3	.....	49.82	19.64	1.00	3	93	24.0	3.10	1.18	.84
4	.....	43.60	16.20	.76	4	112	17.5	3.10	.93	.32
5	5,700	42.20	14.44	.60	5	196	17.0	4.50	.93	.32
6	4,200	38.35	13.16	.48	6	560	18.5	2.50	.93	.24
7	3,970	35.91	11.90	.42	7	920	15.5	2.50	.93	.24
8	3,580	32.30	10.46	.42	8	786	15.0	1.81	.16	.05
9	3,190	28.89	9.46	.30	9	768	15.5	.84	.16	.04
10	2,220	27.77	7.86	.24	10	728	13.5	.84	.16	.04
11	2,060	32.30	6.30	.24	11	928	13.0	.84	.84	.03
12	1,990	30.02	4.88	.18	12	1,006	13.5	.84	1.10	.03
13	1,990	28.89	4.10	.11	13	990	13.0	.84	.93	.03
14	900	26.10	4.88	.11	14	992	18.5	.84	.84	.03
15	430	23.90	20.16	.09	15	954	21.0	.84	.84	0
16	380.00	20.16	10.10	.07	16	876	83.0	.50	.24	0
17	210.20	17.64	133.50	.07	17	764	78.0	.38	.24	0
18	200.34	15.76	51.46	.04	18	702	58.0	.58	.24	0
19	208.50	14.00	37.13	.04	19	564	53.0	.43	.24	0
20	171.24	12.32	22.82	.03	20	455	49.0	.13	.24	0
21	133.50	11.54	10.10	.02	21	436	38.0	1.18	.24	0
22	127.50	11.18	4.36	0	22	426	24.0	.84	.24	0
23	115.57	12.74	4.88	0	23	134	21.0	.84	.24	0
24	97.86	11.54	3.66	0	24	105	16.0	1.18	.05	0
25	94.35	10.82	2.68	0	25	83	13.5	2.50	3.30	0
26	80.31	10.82	1.92	0	26	62	13.5	1.38	18.50	0
27	74.80	17.64	1.40	0	27	48	9.4	3.80	18.50	0
28	67.80	14.44	1.15	0	28	43	9.4	3.30	13.50	0
29	60.15	12.74	1.92	0	29	35	9.4	2.90	5.50	0
30	53.10	39.61	1.30	0	30	32	9.4	1.28	3.80	0
31	.....	47.40	.....	0	31	.....	9.4	.....	1.81	0

[a] Estimated.

Daily discharge, in second-feet, of Lodge Creek at international boundary, 1910–1917—Continued.

Day.	Mar.	Apr.	May.	June.	Oct.	Day.	Mar.	Apr.	May.	June.	Oct.
1914.						1914.					
1	.....	112	13.60	0.22	0	16	554.0	217	14.00	0.08	9.00
2	.....	123	12.00	.16	0	17	496.0	181	8.40	.04	8.40
3	.....	347	10.60	.10	0	18	191.0	169	6.30	.02	6.00
4	.....	175	9.40	.16	0	19	113.0	108	4.50	0	6.00
5	.....	170	8.70	.13	0.34	20	62.0	81	3.30	0	4.30
6	.....	244	9.80	.28	.40	21	63.0	63	3.60	0	2.60
7	.....	360	7.80	.31	.16	22	48.0	51	2.80	0	2.60
8	.....	221	6.00	.19	9.00	23	43.0	43	2.30	0	1.10
9	.....	135	7.50	.13	194.00	24	30.0	38	2.30	0	.96
10	.....	203	4.30	.08	138.00	25	13.6	32	2.20	0	.82
11	.....	119	4.10	.08	85.00	26	10.2	25	1.70	0	.75
12	.....	72	3.90	.09	42.00	27	9.4	25	1.10	0	.68
13	.....	85	3.60	.16	20.00	28	6.3	26	0.89	0	.40
14	.....	103	7.50	.16	15.20	29	8.1	26	.54	0	.47
15	138.0	124	14.00	.10	12.20	30	9.0	23	.40	0	.37
						31	14.0	.....	.28	.....	.34

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1915.								
1	.....	960.00	1.38	0.47	0.34	6.30	3.80	0.24
2	.....	993.00	.90	1.00	.21	4.40	4.90	.24
3	.....	1177.00	.70	58.00	.10	2.90	4.40	.21
4	.....	1401.00	.54	22.00	.08	2.50	3.40	.21
5	.....	1162.00	.41	11.60	.08	1.80	2.70	.21
6	.....	695.00	.47	10.70	.07	1.24	2.50	.17
7	.....	343.00	.34	37.00	.07	1.00	1.80	.14
8	.....	226.00	.47	66.00	.47	.60	1.80	.14
9	.....	163.00	.28	49.00	.10	.28	1.52	.10
10	.....	108.00	.24	34.00	1.00	.21	1.10	.10
11	.....	97.00	.24	23.00	14.60	.17	1.10	.10
12	.....	69.00	.17	17.10	9.80	.08	1.80	.10
13	.....	58.00	69.00	13.60	9.80	.08	1.80	.10
14	.....	49.00	49.00	11.60	23.00	.10	1.52	.10
15	.....	44.00	45.00	8.90	405.00	.09	1.24	.10
16	.....	37.00	32.00	7.10	385.00	.09	1.10	.10
17	.....	36.00	20.00	6.70	283.00	.08	1.00	1.00
18	.....	32.00	[a]16.10	4.90	393.00	.04	1.00	.80
19	.....	27.00	[a]11.60	5.20	216.00	.01	1.00	.70
20	.....	24.00	[a]7.60	4.60	104.00	.00	.80	.54
21	.....	21.00	[a]5.60	3.80	60.00	1.38	.60	.47
22	.....	15.60	[a]3.40	3.40	41.00	456.00	.60	.47
23	.....	14.10	6.30	2.70	29.00	127.00	.47	.47
24	123	14.60	4.90	1.98	23.00	51.00	.41	.47
25	588	13.10	3.80	1.24	18.80	35.00	.34	.34
26	456	11.60	2.90	1.52	16.60	23.00	.28	.28
27	390	9.40	1.80	1.00	12.60	17.70	.28	.28
28	447	6.30	1.00	.60	10.70	12.60	.28	.28
29	502	3.10	.54	.54	9.30	9.80	.24	.28
30	447	1.66	.47	.47	9.80	7.10	.34	.28
31	450	.....	.34	.....	8.00	4.90	.....	.28

[a] Estimated.

Daily discharge, in second-feet, of Lodge Creek at international boundary, 1910–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1916.								
1	.....	144.0	14.5	425.0	94.0	48.0	0.58	0.20
2	.....	113.0	14.0	284.0	32.0	26.0	.58	.20
3	.....	108.0	13.0	151.0	36.0	23.0	.58	2.00
4	.....	96.0	14.5	108.0	1,181.0	21.0	2.80	2.00
5	.....	86.0	13.0	66.0	738.0	17.0	3.30	2.00
6	.....	71.0	12.0	54.0	230.0	14.5	56.00	.58
7	.....	66.0	10.0	44.0	198.0	13.5	29.00	.58
8	.....	50.0	9.2	64.0	123.0	10.0	20.00	4.60
9	.....	44.0	8.8	76.0	96.0	11.2	29.00	10.00
10	.....	47.0	10.0	56.0	86.0	12.0	26.00	.58
11	.....	49.0	9.2	42.0	48.0	12.0	19.40	23.00
12	1,990	66.0	10.0	321.0	36.0	10.0	14.50	17.00
13	2,033	71.0	9.2	855.0	26.0	10.0	12.00	17.00
14	1,904	87.0	8.0	303.0	20.0	17.0	10.00	14.50
15	848	79.0	10.0	196.0	14.5	20.0	9.20	13.50
16	485	63.0	9.2	127.0	14.0	17.0	6.30	11.20
17	460	63.0	8.0	91.0	13.5	15.0	5.60	9.60
18	344	56.0	7.7	66.0	28.0	14.5	4.60	8.00
19	333	44.0	7.0	48.0	81.0	13.0	3.30	7.30
20	333	40.0	6.3	40.0	125.0	9.2	2.80	6.60
21	816	38.0	6.0	36.0	91.0	7.3	2.80	4.60
22	1,121	30.0	6.0	31.0	56.0	5.6	1.43	7.30
23	1,140	25.0	6.0	29.0	74.0	5.6	.58	6.60
24	708	23.0	7.0	26.0	46.0	4.6	.58	6.30
25	447	23.0	23.0	23.0	32.0	4.6	.48	6.30
26	435	19.4	32.0	20.0	25.0	4.1	.44	6.30
27	1,032	18.2	61.0	17.0	22.0	6.3	.39	6.00
28	525	15.5	48.0	20.0	214.0	4.6	.39	6.00
29	354	14.0	61.0	18.8	91.0	4.6	.34	6.00
30	303	13.5	214.0	184.0	197.0	3.3	.28	6.00
31	206	.....	437.0	.....	86.0	2.0	.....	6.00

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1917.					1917.				
1	[a]0.1	160	25.0	0.30	16	1,560.0	234	10.4	0.10
2	[a].2	155	23.0	.30	17	1,090.0	158	8.8	.....
3	[a].5	206	22.0	.30	18	682.0	142	8.0	.....
4	[a]5.0	309	22.0	.30	19	506.0	114	8.0	.....
5	[a]198.0	331	22.0	.30	20	538.0	89	6.6	.....
6	[a]193.0	319	21.0	.30	21	952.0	84	4.6	.....
7	284.0	301	18.0	.20	22	1,410.0	65	4.6	.....
8	948.0	447	17.0	.10	23	1,540.0	63	4.6	.....
9	1,780.0	613	16.0	.20	24	1,250.0	63	4.1	.....
10	2,100.0	654	16.0	.10	25	864.0	65	3.0	.....
11	1,480.0	593	16.0	.10	26	503.0	53	2.5	.....
12	1,580.0	547	15.0	.10	27	361.0	48	2.0	.....
13	1,500.0	418	14.0	.10	28	372.0	41	.6	.....
14	1,330.0	355	13.0	.10	29	381.0	35	.4	.....
15	1,520.0	323	12.0	.10	30	249.0	30	.3	.....
					31	.....	28	.....	.....

[a] Estimated

NOTE.—1910: Channel dry from June 14 to end of year.
1912: Water standing in pools after July 22. Ice conditions Apr. 1–4.
1913: Water standing in pools after Aug. 15.
1914: Channel dry from June 19 to Oct. 5.
1915: Stage-discharge relation affected by ice Mar. 23 to 31.
1917: Shifting control Apr. 7 to May 7 and May 16 to June 29. No flow July 17 to Sept. 30.

Monthly discharge of Lodge Creek at international boundary, 1910–1917.

[Drainage area, 806 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1910.						
April 25–30	6.91	5.15	6.40	0.008	0.002	76
May 1–14	4.34	.17	1.41	.002	.001	39
The period					.003	115
1911.						
March 17–31	684.00		141.00	.175	.098	4,198
April	377.00	34.00	106.50	.132	.147	6,337
May	59.00	3.20	15.70	.019	.022	965
June	92.00	0.90	16.50	.020	.022	982
July	321.00		27.50	.034	.039	1,691
August				.000	.000	0
September	1,830.00		167.80	.208	.232	9,985
October	4.00	1.00	1.80	.002	.002	111
November 1–15	1.50	1.00	1.30	.002	.002	39
The period					.564	24,308
1912.						
April 5–30	5,700.00	53.00	1,242.00	1.541	1.480	64,079
May	51.46	10.82	26.51	.033	.037	1,630
June	133.50	1.15	16.42	.020	.022	977
July	1.30		.25			15
The period					1.539	66,701
1913.						
April	1,006.00	32.00	465.00	.577	.644	27,705
May	83.00	9.40	24.00	.030	.036	1,513
June	7.00	.13	1.82	.002	.003	108
July	18.50	.05	2.54	.003	.004	156
August	1.81		.17			10
The period					.687	29,492
1914.						
March 15–31	554.00	6.30	106.00	.132	.083	3,587
April	360.00	23.00	123.00	.153	.171	7,319
May	14.00	.28	5.70	.007	.008	350
June	.31		.08			5
July						
August						
September						
October	194.00		18.10	.022	.025	1,113
The period					.287	12,374
1915.						
March 24–31	588.00	123.00	425.00	.527	.156	6,764
April	1,401.00	1.66	260.00	.322	.359	15,471
May	69.00	.17	9.30	.011	.013	572
June	66.00	.47	13.70	.017	.019	815
July	405.00	.07	67.00	.083	.096	4,120
August	456.00		25.00	.031	.036	1,537
September	4.90	.24	1.47	.002	.002	87
October	1.00	.10	.30	.000	.000	18
The period					.681	29,384
1916.						
March 12–31	2,033.00	206.00	791.00	.981	.726	31,371
April	144.00	13.50	55.00	.068	.076	3,273
May	437.00	6.00	36.00	.045	.052	2,214
June	855.00	17.00	127.00	.158	.176	7,557
July	1,181.00	13.50	134.00	.166	.191	8,239
August	48.00	2.00	12.50	.016	.018	769
September	56.00	.28	8.80	.011	.012	524
October	23.00	.20	7.00	.009	.010	430
The period					1.261	54,377
1917.						
April	2,100.00	0.10	839.00	1.041	1.160	49,924
May	654.00	28.00	228.00	.283	.326	14,019
June	25.00	.30	11.40	.014	.016	678
July	.30	.00	.10	.000	.000	6
August	.00	.00	.00	.000	.000	0
September	.00	.00	.00	.000	.000	0
October	.00	.00	.00	.000	.000	0
The period					1.502	64,627

Mean monthly discharge, in second-feet, of Lodge Creek at international boundary, 1910–1917.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total in acre-feet.
1910	.....	[a] 6	[b] 1.0	0	0	0	0	0	0	[a] 137
1911	[b] 68	106	15.7	16.50	28.00	0	168.00	1.80	[a] 1.30	24,308
1912	0	[c] 1,242	26.0	16.40	.25	0	0	0	0	76,526
1913	[d] 2	465	24.0	1.82	2.50	.17	0	0	.....	29,615
1914	[d] 62	123	5.7	.08	0	0	0	18.10	.....	12,599
1915	[b] 110	260	9.3	13.70	67.00	25.00	1.47	.30	.....	29,384
1916	[d] 525	55	36.0	127.00	134.00	12.50	8.80	7.00	.....	55.287
1917	0	839	228.0	11.40	.10	0	0	.....	.....	64,627
Average	110	441	43	23	29	4.7	22	3.9	.....	41,764
Average run-off, acre-feet	6,763	26,241	2,644	1,369	1,783	289	1,309	240	.....	40,638
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	50

[a] Incomplete record not included in average.
[b] Reduced to monthly average.
[c] Average for part of month assumed as monthly average.
[d] Estimated.

Duration of flow (number of days in the year) of Lodge Creek at international boundary, 1910–1917.

Flow (second-feet).	1910	1911	1912	1913	1914	1915	1916	1917	Total.	Average.
5,000	.....	.....	1	.....	.....	.....	.....	.....	1	.....
4,000	.....	.....	2	.....	.....	.....	.....	.....	2	.....
3,000	.....	.....	5	.....	.....	.....	.....	.....	5	.....
2,000	.....	.....	7	.....	.....	.....	1	1	9	1
1,500	.....	2	9	.....	.....	.....	3	7	21	3
1,400	.....	2	9	.....	.....	1	3	9	24	3
1,300	.....	2	9	.....	.....	1	3	10	25	3
1,200	.....	2	9	.....	.....	1	3	11	26	3
1,100	.....	2	9	.....	.....	3	6	11	31	4
1,000	.....	2	9	1	.....	3	7	12	34	4
900	.....	3	10	6	.....	5	7	14	45	6
800	.....	3	10	7	.....	5	10	15	50	6
700	.....	3	10	12	.....	5	12	15	57	7
600	.....	6	10	12	.....	6	12	18	64	8
500	.....	6	10	14	1	8	13	23	75	9
450	.....	6	10	15	2	11	15	23	82	10
400	.....	6	11	17	2	14	19	25	94	12
350	.....	7	12	17	3	18	20	29	106	13
300	.....	10	12	17	4	19	26	34	122	15
250	.....	10	12	17	4	19	27	35	124	15
200	.....	12	15	17	8	21	31	38	142	18
150	.....	12	16	18	14	22	36	43	161	20
100	.....	23	20	21	24	26	43	45	202	25
90	.....	25	22	22	24	27	49	45	214	27
80	.....	28	23	26	27	27	54	47	232	29
70	.....	31	24	27	28	27	59	47	243	30
60	.....	35	26	28	31	31	68	51	270	34
50	.....	39	29	30	32	34	74	52	290	36
40	.....	50	34	33	36	40	87	54	334	42
30	.....	65	42	36	39	47	96	56	381	48
20	.....	73	51	42	45	57	119	63	450	56
10	.....	84	72	59	51	76	163	73	581	73
9	.....	84	73	64	61	82	170	73	607	76
8	.....	85	73	64	65	84	174	76	620	77
7	.....	91	74	65	68	87	180	76	641	89
6	5	96	75	65	73	91	196	77	678	85
5	6	103	75	66	73	93	199	78	693	87
4	7	120	80	67	77	101	207	82	741	93
3	9	130	81	74	81	107	210	83	775	97
2	11	144	82	78	87	113	217	85	817	102
1	11	194	90	90	90	141	218	85	919	115
0	20	205	108	136	123	292	234	107	1,225	153

LODGE CREEK NEAR CHINOOK, MONT.

LOCATION.—In sec. 26, T. 33 N., R. 19 E., at highway bridge half a mile east of Chinook, Mont., in Blaine County. July 1, 1907, to April 16, 1908, station was in sec. 15 or 16, T. 33 N., R. 19 E., at the Rainholt ranch, 2 miles upstream. (See Pl. XXI.)

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 9, 1906, to June 30, 1908.

GAGE.—The original gage was an inclined staff 170 feet above the bridge. An extension consisting of a vertical rod reading from 14 to 19 feet was installed April 25, 1906. On June 27, 1906, a chain gage was installed on the upstream side of the highway bridge. On July 1, 1907, a new gage was installed at the Rainholt ranch of the Empire Cattle Co., 2 miles upstream; this gage was used July 1, 1907, to April 16, 1908, when readings were resumed at the highway bridge.

DISCHARGE MEASUREMENTS.—Made from highway bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and mud; likely to shift. Backwater from Milk River affected stage-discharge relation during floods on Milk River.

ICE.—Stream freezes over during winter months but there is practically no flow.

DIVERSIONS.—West Fork ditch diverts about 4 miles north of Chinook. The first diversion was made in 1898. There are also other small diversions both in Canada and the United States. Water from Fort Belknap canal is at times wasted into the creek below the Rainholt ranch but above the highway bridge.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent; affected by backwater at high stages in Milk River. Records fair.

Discharge measurements of Lodge Creek, near Chinook, Mont., 1906–1908.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1906.		*Feet.*	*Sec.-ft.*	1907.		*Feet.*	*Sec.-ft.*
Apr. 18	Morse and Freeman	3.02	13	Apr. 6	Follansbee and Pierson	6.64	214
25	do	2.90	1.0	11	J. B. Pierson	12.73	734
May 28	W. B. Freeman	6.50	212	15	do	16.45	1,410
28	do	6.95	242	20	do	14.50	1,180
29	do	9.07	413	May 3	do	7.36	306
29	do	9.32	420	13	do	7.38	290
30	do	10.70	619	27	do	4.71	115
31	Freeman and Hartman	16.17	1,490	June 15	do	3.20	18.2
31	do	16.42	1,470	24	do	7.55	300
June 1	W. B. Freeman	16.58	1,800	25	do	4.40	94
2	Freeman and Hartman	12.66	1,010	26	Follansbee and Pierson	.92	33.1
2	do	11.79	948	July 6	J. B. Pierson	.51	12.2
5	do	5.30	148	16	do	.36	6.8
12	Freeman and Morse	13.92	1,030	20	do	.32	5.3
16	W. B. Freeman	5.57	179	29	do	.19	1.6
25	Freeman and Hartman	13.26	901	Aug. 19	do	.16	.15
July 23	W. S. Hartman	2.30	7.8	26	do	.06	.05
Aug. 11	Morse and Hartman	2.73	.2				
				1908.			
				May 5	A. F. Huch	3.28	4.1
				26	do	3.06	.26
				June 7	do	3.3	.25

NOTE.—1906: Apr. 18 and 25 discharge estimated.
1907: Apr. 24, the overflow amounted to 335 second-feet, the regular station gage reading 16.5 feet. From June 26 to Aug. 26, 1907, the gage heights refer to a new gage placed about 2 miles above the old one.
1908: May 5, new gage read 0.42 feet. May 26 and June 7, discharge estimated.

Daily discharge, in second-feet, of Lodge Creek, near Chinook, Mont., 1906–7.

Day.	Apr.	May.	June.	July.	Aug.	Day.	Mar.	Apr.	May.	June.	July.	Aug.
1906.						1907.						
1	.....	2	1,830	103	3	1	.....	19	175	68	35	1
2	.....	2	1,160	82	3	2	.....	64	178	62	29	1
3	.....	2	430	80	2	3	.....	82	251	51	21	1
4	.....	2	220	72	2	4	.....	64	240	45	20	.5
5	.....	2	148	58	2	5	.....	106	198	45	16	.5
6	.....	2	312	48	1	5	.....	240	186	45	13	.5
7	.....	5	630	42	1	7	.....	230	165	45	11	.5
8	.....	5	1,550	42	1	8	.....	135	190	43	9	.5
9	48	2	2,450	36	0	9	.....	462	187	39	10	.5
10	40	2	3,000	34	.....	10	.....	560	174	31	8	0
11	43	2	2,650	10	.....	11	.....	745	250	37	8	.....
12	26	2	968	13	.....	12	.....	625	370	31	8	.....
13	20	5	586	15	.....	13	.....	770	314	26	8	.....
14	17	2	300	17	.....	14	.....	1,210	212	22	8	.....
15	5	2	298	10	.....	15	.....	1,700	223	22	8	.....
16	2	2	175	8	.....	16	.....	1,830	220	20	7	.....
17	2	2	142	8	.....	17	.....	1,720	204	17	7	.....
18	9	2	116	8	.....	18	.....	1,720	174	17	7	.....
19	14	9	90	8	.....	19	.....	1,220	184	20	7	.....
20	14	2	74	8	.....	20	.....	1,160	224	26	7	.....
21	9	9	68	7	.....	21	.....	1,250	204	34	4	.....
22	9	9	60	6	.....	22	.....	1,830	168	37	4	.....
23	9	9	792	6	.....	23	25	2,050	168	48	2	.....
24	9	9	364	6	.....	24	25	1,700	160	236	2	.....
25	2	9	875	5	.....	25	25	960	165	98	2	.....
26	2	12	618	5	.....	26	29	630	134	98	2	.....
27	2	9	327	5	.....	27	23	430	119	50	2	.....
28	2	181	270	4	.....	28	19	295	99	33	2	.....
29	2	430	182	4	.....	29	17	278	89	23	2	.....
30	2	690	128	4	.....	30	17	220	84	15	2	.....
31	.....	1,580	.....	3	.....	31	17	.....	74	.....	2	.....

NOTE.—1906: Practically no flow Jan. 1 to Apr. 8 and after Aug. 9.
1907: Practically no flow Jan. 1 to Mar. 22, and Aug. 10 to Dec. 31.

Daily gage height, in feet, of Lodge Creek near Chinook, Mont., 1908.

Day.	Apr.	May.	June.	Day.	Apr.	May.	June.	Day.	Apr.	May.	June.
1	.....	3.75	3.6	11	.....	3.1	7.05	2	4.4	3.3	3.6
2	.....	3.35	3.55	12	.....	3.1	4.9	22	4.15	3.65	3.6
3	.....	3.3	3.7	13	.....	3.1	3.8	23	3.85	3.35	3.65
4	.....	3.3	3.8	14	.....	3.1	3.55	24	3.8	3.3	3.7
5	.....	3.3	3.85	15	.....	3.1	3.25	25	3.65	3.25	3.8
6	.....	3.55	3.7	16	3.5	3.4	3.1	26	3.6	3.25	3.35
7	.....	3.3	3.3	17	4.3	3.35	3.2	27	3.7	3.05	2.9
8	.....	3.15	3.1	18	4.85	3.3	3.55	28	3.6	2.9	2.9
9	.....	3.1	3.85	19	4.55	3.5	3.6	29	3.6	3.0	2.95
10	.....	3.05	5.25	20	4.45	3.5	3.6	30	3.6	3.0	3.0
								31	.....	3.6	.....

NOTE.—There was no flow after June 26, 1908, and very little at any time during the year. Daily discharge not computed because of insufficient discharge measurements.

Monthly discharge of Lodge Creek near Chinook, Mont., 1906–7.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1906.				
April 9–30	48	2	13.1	572
May	1,580	2	96.9	5,960
June	3,000	60	694	41,300
July	103	3	24.4	1,500
August 1–8	3	1	1.9	30
The period				49,400
1907.				
March 23–31	29	17	21.9	391
April	2,050	19	810	48,200
May	370	74	187	11,500
June	236	15	46.1	2,740
July	35	2	8.8	541
August	1	0	.19	12
The period				63,384

THELMA CREEK AT ENGLISH'S RANCH, NEAR THELMA, ALTA.

[Formerly called East Branch of Lodge Creek.]

LOCATION.—In SE. ¼ sec. 1, T. 7, R. 3 W. fourth meridian, 2 miles south of Thelma post office.

DRAINAGE AREA.—15 square miles.

RECORDS AVAILABLE.—Station established October 7, 1911; gage heights from October 7 to end of season 1911; daily discharge not computed; complete open-water records 1912–1917.

GAGE.—Vertical staff; read by Mrs. A. English.

DISCHARGE MEASUREMENTS.—Made with weir or by wading with current meter, according to stage of stream.

CHANNEL AND CONTROL.—Bed of creek composed of gravel. Banks subject to overflow at flood stages.

Artificial control placed in creek on August 19, 1915.

EXTREMES OF STAGE.—1911–1916: Maximum stage recorded, 4.62 feet; June 11, 1916 (discharge, 323 second-feet). Creek is generally dry during August and September.

ACCURACY.—Stage-discharge relation permanent. Gage read twice daily at high stages and once daily at low stages. Records poor, owing to inaccurate gage-height observations, except those for 1917, which are good.

Discharge measurements of Thelma Creek at English's ranch, near Thelma, Alta., 1911–1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1911.		*Feet.*	*Sec.-ft.*	1915.		*Feet.*	*Sec.-ft.*
Oct. 7	M. H. French	0.96	1.04	Aug. 19	H. W. Rowley	0.89	0
1912.				Sept. 13	do	Dry.	0
May 20	G. R. Elliott	1.14	3.56	Oct. 7	do	Dry.	0
June 25	do	.75	.05	30	do	.93	0.17
July 27	do		0	1916.			
Oct. 1	do		0	Mar. 29	P. A. Fetterley	2.75	7.40
Nov. 1	do	.84	.15	30	do	2.76	3.40
1913.				Apr. 10	do	1.59	10.10
May 10	H. D. St. A. Smith	1.35	6.44	10	do	1.60	10.20
June 12	do	.88	[a] .24	11	do	1.64	12.70
July 9	do	.82	[a] .17	May 8	H. W. Rowley	1.12	[a] 1.35
31	do		0	20	do	1.02	[a] .41
Sept. 1	do		0	June 17	do	1.80	11.60
24	do		0	July 12	do	1.55	3.60
Oct. 15	do		0	Aug. 3	do	1.43	[a] .82
Nov. 10	do		0	23	do	1.42	[a] .73
1914.				Sept. 19	do	1.40	[a] .66
May 18	H. W. Rowley	1.05	.81	Oct. 8	do	1.56	2.80
June 15	do	.98	.16	Nov. 7	do	1.65	1.59
July 6	do	Dry.	0	1917.			
24	do	Dry.	0	Apr. 4	H. W. Rowley		[b] 1.60
Sept. 25	do	Dry.	0	May 13	V. A. Newhall and J. C. Milligan	2.68	82.00
Oct. 20	do	1.12	1.26	14	do	2.40	48.00
1915.				May 23	J. C. Milligan	1.69	11.90
May 11	H. W. Rowley	.98	.17	June 21	do	1.32	[a c] .34
June 8	do	1.20	2.30	July 25	do	Dry.	0
9	do	1.14	1.59	Aug. 9	do	Dry.	0

[a] Discharge measured with a weir.
[b] Estimated from field inspection.
[c] Seepage through gravel in creek bed.

Daily discharge, in second-feet, of Thelma Creek at English's ranch, Alta., 1912–1917.

Day.	Apr.	May.	June.	July.	Oct.	Day.	Apr.	May.	June.	July.	Oct.
1912.						1912.					
1		7.65	4.90	0.02		16	13.28	4.90	0.44		0.05
2		8.49	4.36	.02		17	14.00	4.36	.35		.06
3		7.37	3.55	.02		18	10.25	3.82	.35		.06
4		7.09	3.07	.02		19	15.60	3.31	.20		.07
5	73.18	10.55	2.83	.02		20	10.55	2.59	.16		.07
6	54.70	14.00	2.35	.02		21	10.25	2.83	.12		.08
7	54.70	15.20	2.01	.02		22	10.55	3.07	.08		.08
8	78.30	15.20	1.67	.02		23	10.55	3.07	.05		.08
9	73.18	12.20	1.30	.02		24	10.25	2.83	.03		.08
10	78.30	10.55	1.03	.02		25	10.55	3.07	.02		.08
11	47.60	8.49	.58	.02		26	9.65	3.07	.02		.08
12	29.00	7.65	.49			27	8.77	112.00	.02		.09
13	18.00	6.25	.39			28	9.35	30.50	.03		.09
14	13.64	4.90	.92		0.05	29	10.55	9.95	.03		.10
15	12.20	4.90	.49		.05	30	8.49	8.77	.02		.14
						31		7.65			.20

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1913.					1913.				
1	0.00	4.10	0.11	3.70	16	114.00	10.90	0.16	0.16
2	[a] 2.00	4.40	.07	3.70	17	93.00	10.17	.11	.16
3	[a] 4.00	4.70	.07	3.00	18	79.00	7.60	.11	.16
4	[a] 5.00	4.80	.07	1.69	19	69.00	7.60	.11	.16
5	[a] 6.00	5.30	.07	.78	20	57.00	6.40	.10	.16
6	[a] 7.00	5.30	.07	.16	21	45.00	3.40	.08	.16
7	[a] 10.00	5.30	.07	.16	22	39.00	3.60	.07	.16
8	[a] 12.00	5.30	.07	.16	23	25.00	2.20	.07	.11
9	[a] 13.00	4.40	.09	.16	24	19.70	1.92	.07	.11
10	[a] 18.00	6.40	.09	.16	25	15.60	1.58	.26	.11
11	[a] 29.00	7.10	.11	.16	26	8.20	1.09	1.19	.11
12	[a] 30.00	7.60	.12	.16	27	5.80	.70	2.33	
13	[a] 42.00	7.60	.14	.16	28	5.30	.58	3.00	
14	[a] 72.00	9.10	.17	.16	29	5.30	.41	3.00	
15	[a] 100.00	14.00	.16	.16	30	4.20	.23	3.00	
					31		.14		

[a] Estimated.

Daily discharge, in second-feet, for Thelma Creek at English's ranch, Alta., 1912–1917—Continued.

Day.	Apr.	May.	June.	Oct.	Day.	Apr.	May.	June.	Oct.
1914.					1914.				
1	26.0	1.90	0.18	0	16	14.2	1.16	1.74	12.80
2	28.0	1.90	.18	0	17	12.6	1.16	1.51	12.20
3	30.0	1.62	.28	0	18	12.2	.68	1.16	11.20
4	34.0	1.62	.28	0	19	11.2	.68	1.16	10.20
5	32.0	1.16	.44	0	20	9.2	.52	.97	8.20
6	33.0	1.74	.28	0	21	8.2	.28	.28	6.20
7	16.2	2.00	.44	0	22	7.2	.28	.28	4.20
8	7.5	2.90	.78	0	23	6.2	.28	.18	2.40
9	7.3	14.20	.78	0	24	5.5	.04	.18	1.16
10	8.6	11.80	1.16	0	25	4.2	.04	.28	.28
11	9.8	8.20	1.89	0	26	3.2	.04	.28	0
12	23.0	6.20	2.15	0	27	2.9	.04	.18	0
13	24.0	5.20	2.40	0	28	2.9	.04	.04	0
14	13.0	3.80	2.15	13.20	29	2.4	.04	.04	0
15	16.2	1.74	2.00	13.20	30	1.9	.04	.04	0
					31	.....	.04	.....	0

Day.	Apr.	May.	June.	July.	Aug.	Oct.	Day.	Apr.	May.	June.	July.	Aug.	Oct.
1915.							1914.						
1	4.50	0.08	0.28	a0.28	0.23	0	16	3.70	5.50	0.65	3.70	0	0.44
2	9.00	.08	1.94	a.08	.28	0	17	4.00	6.40	.28	3.00	0	.58
3	34.00	.08	4.90	a0	0	0	18	3.00	5.20	.28	2.30	0	.58
4	29.00	.08	26.00	0	0	0	19	2.60	4.50	.28	.65	b0.02	.58
5	16.00	.08	24.00	0	0	0	20	2.30	3.70	.08	.28	0	.58
6	10.50	.00	24.00	0	0	0	21	3.00	2.20	.08	c.57	0	.58
7	7.50	.00	16.00	0	0	0	22	3.00	a1.70	.08	.93	0	.58
8	5.20	.00	4.50	0	0	.32	23	3.00	1.13	.08	.93	0	.58
9	4.50	.00	1.58	0	0	.44	24	2.30	2.30	.28	1.13	0	.58
10	4.50	.00	2.30	0	0	.44	25	2.30	2.10	.65	1.35	0	.26
11	3.00	.00	2.30	0	0	.44	26	1.70	.65	.65	1.35	0	.26
12	3.70	.00	2.30	0	0	.44	27	1.70	.28	1.70	1.70	0	.26
13	3.00	1.35	1.70	.57	0	.44	28	1.13	.08	1.13	1.70	0	.26
14	3.00	1.82	1.13	12.30	0	.44	29	.65	.08	.28	2.30	0	.26
15	3.00	5.50	.65	9.70	0	.44	30	.28	.08	.28	2.30	0	.26
							31	.....	.18	.....	2.30	0	.26

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1916.									
1	.....	25.0	69.0	3.30	60.0	22.00	a0.85	0.02	1.07
2	.....	25.0	65.0	3.30	58.0	38.00	a .83	.02	1.77
3	.....	20.0	45.0	4.70	55.0	60.00	.82	a2.50	2.70
4	.....	20.0	45.0	5.20	52.0	57.00	a .81	5.00	2.70
5	.....	20.0	35.0	3.30	62.0	38.00	a .81	14.10	2.90
6	.....	20.0	25.0	2.10	58.0	a30.00	a .80	8.50	2.90
7	.....	15.0	14.7	2.10	48.0	22.00	a .80	5.00	3.40
8	.....	15.0	13.2	1.30	13.2	22.00	a .80	3.80	2.90
9	.....	15.0	11.0	1.10	8.3	16.60	a1.80	2.70	3.80
10	.....	15.0	10.0	.92	90.0	11.60	a2.50	1.77	3.40
11	.....	45.0	13.2	.66	323.0	3.80	a2.00	1.07	3.40
12	.....	50.0	9.1	.66	62.0	2.90	a1.75	1.07	2.70
13	.....	50.0	6.7	.66	41.0	1.77	a1.60	1.07	2.30
14	.....	60.0	5.6	.34	28.0	1.77	a1.50	1.07	1.77
15	.....	60.0	4.7	.34	22.0	a1.42	a1.45	.62	1.77
16	.....	60.0	4.7	.34	16.6	1.07	a1.40	.62	1.77
17	40	50.0	4.7	.34	11.6	1.07	a1.20	a .57	1.77
18	40	50.0	4.0	.34	5.0	6.50	a1.00	.52	1.77
19	45	70.0	3.3	.34	29.0	6.50	a .90	.62	1.77
20	50	70.0	4.7	.42	22.0	3.80	a .80	.80	a1.90
21	60	80.0	4.0	.50	16.6	1.77	a .75	.80	a2.00
22	65	40.0	4.7	.58	11.6	1.77	a .73	.89	2.10
23	65	25.0	3.3	7.70	6.5	1.49	.73	.89	2.50
24	50	20.0	3.1	16.20	6.5	1.07	.62	.89	2.90
25	45	15.0	2.5	10.40	6.5	1.07	.52	1.07	2.90
26	45	7.4	2.1	16.20	6.5	1.07	.36	1.49	3.40
27	35	7.4	2.5	101.00	5.0	1.07	.26	1.77	3.40
28	25	7.4	2.3	168.00	3.8	1.07	.19	1.07	a3.00
29	25	7.4	3.1	198.00	66.0	.89	.19	.89	2.70
30	.....	3.4	3.3	187.00	57.0	.89	.02	.89	2.70
31	.....	3.0	.....	69.00	.....	.89	.09	.....	2.70

a Estimated. b Artificial control installed. c Interpolated.

Daily discharge, in second-feet, of Thelma Creek at English's ranch, Alta., 1912–1917— Continued.

Day.	May.	June.	Day.	May.	June.	Day.	May.	June.
1917.			1917.			1917.		
1		3.40	11		3.40	21	15.6	0.64
2		3.40	12		3.40	22	13.6	.40
3		3.40	13	82.0	2.90	23	11.6	.32
4		3.40	14	64.0	2.70	24	11.6	.24
5		3.40	15	59.0	2.90	25	6.4	.24
6		4.20	16	42.0	2.90	26	6.4	.16
7		4.80	17	21.0	a2.20	27	4.8	.08
8		4.80	18	21.0	1.48	28	4.2	
9		5.80	19	19.6	1.00	29	4.0	
10		4.80	20	17.6	.76	30	3.4	
						31	3.4	

a Estimated.

NOTE.—1912: No flow July 12 to Oct. 14.
1913: No flow July 27–31.
1914: No flow July 1 to Oct. 14 and Oct. 26–31.
1915: No flow Aug. 3–18 and Aug. 20 to Oct. 7. Artificial control installed Aug. 19.
1916: Stage-discharge relation affected by ice Feb. 17 to Apr. 10; discharge estimated.
1917: No flow June 28 to Oct. 31. Gage readings unreliable May 8–12; discharge not determined.

Monthly discharge of Thelma Creek at English's ranch, Alta., 1912–1917.

(Drainage area, 15 square miles.)

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1912.						
April 5–30	78.30	8.49	26.75	1.78	1.72	1,382
May	112.00	2.59	11.18	.74	.85	688
June	4.92	.02	1.06	.07	.078	65
July	.02	.00	.01	.0004	.0005	0
October	.20	.05	.049	.0055	.0045	3
The period					2.65	2,138
1913.						
April	114.00	.00	31.200	2.080	2.32	1,856
May	14.00	.14	4.970	.330	.38	306
June	3.00	.07	.603	.040	.04	36
July	3.70	.00	.517	.034	.04	32
The period					2.78	2,230
1914.						
April	34.00	1.90	13.80	.860	.960	821
May	14.20	.04	2.30	.144	.170	141
June	2.40	.04	.79	.049	.060	47
October	13.20	.00	3.07	.191	.220	189
The period					1.410	1,198
1915.						
April	34.00	.28	5.80	.3740	.420	348
May	6.40	.00	1.46	.0936	.110	90
June	26.00	.08	4.00	.2570	.290	238
July	12.30	.00	1.59	.1020	.120	98
August	.28	.00	.02	.00109	.001	1
September	.00	.00	.00	.0000	.000	0
October	.58	.00	.33	.0212	.020	20
The period					.961	795
1916.						
February 17–29	a65.0	a25.00	a45.00	2.880	1.39	1,160
March	a80.0	a 3.00	a31.00	1.980	2.28	1,906
April	a69.0	2.10	14.20	.910	1.03	845
May	198.0	.34	26.00	1.670	1.92	1,599
June	323.0	3.80	42.00	2.690	3.00	2,499
July	60.0	.89	11.60	.744	.86	713
August	2.5	.02	.93	.060	.07	57
September	14.1	.02	2.10	.133	.15	125
October	3.8	1.07	2.54	.163	.19	156
The period					10.88	9,060
1917.						
May 13–31	82.0	3.4	21.0	1.400	.99	791
June	5.8	.0	2.2	.147	.16	131
The period					1.15	922

a Estimated.

NOTE.—1917: No flow June 28 to Oct. 31.

Mean monthly discharge, in second-feet, of Thelma Creek at English's ranch, Alta., 1912–1917.

Year.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Total.
										Acre-ft.
1912	.....	.....	[a] 27.0	11.20	1.06	0.01	0	0	0.05	2,362
1913	.....	.....	31.0	5.00	.60	.52	0	0	0	2,230
1914	.....	.....	13.8	2.30	.79	0	0	0	3.10	1,198
1915	.....	.....	5.8	1.46	4.00	1.59	0.02	0	.33	795
1916	[b] 20	[c] 31	14.2	26.00	42.00	11.60	1.93	2.10	2.54	9,060
1917	.....	.....	.....	[d] 21.00	2.20	0	0	0	0	[d] 922
Average	[c] 4	[c] 15	18.4	9.2	8.4	2.4	.16	.35	1.00	3,129
Average run-off, acre-feet	222	922	1,095	566	500	148	.10	21	61	3,545
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	236

[a] Discharge for part of month assumed as mean for month.
[b] Reduced to monthly average.
[c] Estimated.
[d] Incomplete record not included in average.

MIDDLE CREEK AT MACKINNON'S RANCH, ALTA.

LOCATION.—In SW. ¼ sec. 35, T. 5, R. 1 W. fourth meridian, at Angus MacKinnon's ranch.

DRAINAGE AREA.—116 square miles.

RECORDS AVAILABLE.—Open-water flow June 21, 1910, to April 17, 1915, when station was discontinued.

GAGE.—Vertical staff.

DISCHARGE MEASUREMENTS.—Made by wading or with weir.

CHANNEL AND CONTROL.—Bed composed of sand and coarse gravel; not likely to shift. Right bank slopes gradually; left bank cut sharp and high; neither bank subject to overflow except in extreme flood stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 4.85 feet, April 11, 1911, (discharge, 156 second-feet); minimum stage recorded, 0.62 feet (discharge, 0.15 second-foot) on December 31, 1910.

ICE.—Observations discontinued during winter season.

ACCURACY.—Stage-discharge relation practically permanent. Gage read to hundredths daily. Daily discharge obtained by applying daily gage height to rating table. Records fair.

Discharge measurements of Middle Creek at MacKinnon's ranch, Alta., 1910–1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1910.		*Feet.*	*Sec.-ft.*	1913.		*Feet.*	*Sec.-ft.*
June 21	H. R. Carscallen	0.76	0.47	Apr. 19	H. D. St. A. Smith	2.64	31.20
July 11	do	.74	.32	June 3	do	.75	1.17
29	do	.68	.17	24	do	.78	.88
Aug. 16	do	.68	.26	July 18	do	.53	.33
Sept. 3	do	.67	.34	Aug. 14	do	.55	.35
29	R. G. Swan	.64	.30	Sept. 11	do	.49	.30
Oct. 25	do	.66	.35	Oct. 7	do	.54	.33
1911.				1914.			
Apr. 24	M. H. French	2.10	17.05	Mar. 23	H. R. Carscallen	2.14	.83
May 20	do	.62	1.01	Apr. 28	H. W. Rowley	1.10	2.98
June 12	do	.55	.56	May 19	do	.81	.98
July 20	do	.71	.53	June 16	do	.60	.71
Aug. 11	do	.68	.67	July 7	do	.55	.47
Oct. 4	do	.63	.94	31	do	.60	.24
1912.				Aug. 26	do	.54	.19
May 1	M. H. French	2.45	25.80	Sept. 26	do	.79	.20
31	G. R. Elliott	1.30	4.66	Oct. 22	do	.58	.35
July 10	do	.73	.86	1915.			
31	do	.66	.43	Apr. 20	H. W. Rowley	.84	1.46
Sept. 10	do	.62	.49	June 7	do	.63	.73
Oct. 3	do	.60	.58	Aug. 18	do	1.55	4.60
3	do	.60	.61	Sept. 10	do	.65	.79
Nov. 4	do	.56	.61	Oct. 4	do	.90	.96

Daily discharge, in second-feet, of Middle Creek, at MacKinnon's ranch, Alta., 1910–1915.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1910.									
1	.....	.....	.....	0.78	0.22	0.22	0.22	0.22	0.17
2	.....	.....	.....	.60	.22	.22	.22	.22	.17
3	.....	.....	.....	.99	.24	.22	.22	.22	.17
4	.....	.....	.....	.99	.22	.36	.24	.22	.17
5	.....	.....	.....	1.45	.24	.39	.24	.22	.17
6	.....	.....	.....	.78	.24	.36	.22	.20	.17
7	.....	.....	.....	.44	.22	.39	.22	.20	.17
8	.....	.....	.....	.31	.22	.36	.22	.20	.17
9	.....	.....	.....	.31	.20	.33	.20	.20	.17
10	.....	.....	.....	.44	.18	.33	.20	.20	.17
11	.....	.....	.....	.44	.20	.31	.20	.20	.17
12	.....	.....	.....	.31	.20	.31	.20	.22	.17
13	.....	.....	.....	.44	.34	.22	.20	.22	.17
14	.....	.....	.....	.31	.31	.22	.20	.22	.17
15	.....	.....	.....	.20	.29	.22	.20	.22	.17
16	.....	.....	.....	.20	.29	.22	.20	.22	.17
17	.....	.....	.....	.20	.24	.24	.20	.22	.17
18	.....	.....	.....	.20	.24	.22	.20	.20	.17
19	.....	.....	.....	.20	.20	.22	.22	.20	.17
20	.....	.....	.....	.20	.20	.22	.22	.19	.17
21	.....	.....	0.44	.20	.20	.20	.22	.19	.17
22	.....	.....	.44	.20	.20	.20	.22	.19	.17
23	.....	.....	.44	.78	.22	.20	.22	.19	.17
24	.....	.....	.44	.44	.22	.22	.22	.19	.17
25	.....	.....	.44	.44	.24	.22	.22	.19	.17
26	.....	.....	.36	.44	.24	.22	.22	.19	.17
27	.....	.....	.31	.31	.24	.20	.22	.19	.17
28	.....	.....	.31	.31	.22	.20	.22	.19	.17
29	.....	.....	.31	.22	.22	.20	.22	.17	.17
30	.....	.....	.31	.22	.22	.22	.22	.17	.17
31	.....	.....	.....	.22	.22	.....	.22	.....	.15
1911.									
1	10.5	2.0	.7	4.0	.5	.4	1.0	.9	.....
2	10.5	1.2	.7	60.0	.8	.4	1.0	.9	.....
3	10.2	2.8	.7	36.0	2.0	.4	1.0	.9	.....
4	10.1	3.8	.7	21.0	.6	1.5	.9	.9	.....
5	10.0	1.7	.7	10.5	.6	4.6	.9	.9	.....
6	9.7	1.5	.6	4.5	25.0	128.0	.9	.9	.....
7	9.7	1.0	.7	2.5	5.5	56.0	.8	.9	.....
8	10.0	1.0	.8	2.0	.6	20.0	.8	.8	.....
9	10.4	.8	.7	1.5	.6	10.6	.8	.8	.....
10	41.0	.8	.6	2.0	.6	8.6	.8	.8	.....
11	156.0	.8	.6	1.5	.7	2.6	.8	.8	.....
12	38.0	.8	.6	1.3	.5	1.9	.8	.8	.....
13	23.0	.7	.6	1.0	.5	1.4	.8	.8	.....
14	6.4	.9	.7	.9	.5	1.0	.8	.8	.....
15	3.1	1.0	.6	.7	.5	1.0	.8	.8	.....
16	2.2	1.5	.6	.6	.5	.9	.8	.....	.....
17	12.0	1.1	.6	.6	.4	.9	.8	.....	.....
18	31.0	1.0	.7	.6	.4	.9	.8	.....	.....
19	22.6	.8	.8	.5	.4	.9	.8	.....	.....
20	26.4	.9	.5	.6	.4	.9	.9	.....	.....
21	22.4	.8	.7	.5	.4	.9	.9	.....	.....
22	19.4	.8	1.0	.5	.4	1.0	.9	.....	.....
23	16.5	1.0	18.0	.5	.4	1.0	.9	.....	.....
24	18.2	.9	39.0	.5	.4	1.0	.9	.....	.....
25	8.6	.9	24.0	.5	.4	1.0	.9	.....	.....
26	6.1	.9	4.4	.5	.4	1.0	.9	.....	.....
27	2.7	.8	24.0	.5	.4	.9	.9	.....	.....
28	3.4	.8	13.5	.5	.4	.9	.9	.....	.....
29	4.6	.8	4.0	.5	.4	.9	.9	.....	.....
30	4.4	.8	3.3	.5	.4	.9	.9	.....	.....
31	.....	.8	.....	.5	.4	.....	.9	.....	.....

Daily discharge, in second-feet, of Middle Creek, at MacKinnon's ranch, Alta., 1910–1915—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1912.								
1	.....	25.80	2.72	a0.68	0.41	0.49	0.59	0.61
2	.....	a25.52	a2.30	.77	.47	.49	.60	.61
3	.....	a25.24	2.18	a.77.	.43	.51	.58	.61
4	.....	24.96	2.18	a.77	.41	.53	.58	.61
5	.....	23.87	a2.00	.77	.41	.51	.58	.61
6	.....	23.87	1.88	a.77	.41	.51	.58	.61
7	.....	a23.60	1.83	.77	.41	.51	.58	.61
8	.....	a23.60	1.60	a.77	.41	.53	.58	.61
9	.....	a23.34	1.33	.77	.40	.47	.58	.61
10	.....	a21.75	1.33	.77	.40	.49	.58	.61
11	.....	a19.30	.82	a.77	.40	.49	.58	.61
12	.....	16.89	.77	.73	.40	.49	.58	.61
13	.....	a13.00	.68	.73	.40	.50	.58	.61
14	.....	a9.70	.68	.73	.40	.50	.58	.61
15	.....	7.99	1.33	a.73	.50	.50	.58	.61
16	.....	4.52	.97	.73	.45	.51	.59	.....
17	.....	a4.25	.82	.73	.45	.51	.59	.....
18	.....	a3.80	.82	.73	.45	.52	.59	.....
19	.....	3.64	a.82	a.73	.48	.52	.59	.....
20	.....	3.64	a.82	.73	.47	.53	.59	.....
21	.....	a3.40	.82	.92	.47	.55	.59	.....
22	.....	a3.00	a.82	.77	.47	.55	.59	.....
23	.....	2.86	.82	.73	.47	.55	.60	.....
24	.....	a2.72	a.82	.73	.47	.56	.60	.....
25	.....	a2.65	a.82	.73	.47	.56	.60	.....
26	.....	2.51	.82	.68	.49	.57	.60	.....
27	.....	2.51	.77	.68	.51	.57	.60	.....
28	.....	a2.30	.77	.43	.49	.58	.60	.....
29	.....	2.00	.77	.41	.53	.59	.60	.....
30	.....	a2.00	1.07	.40	.53	.59	.63	.....
31	.....	4.70	.....	.43	.51	.....	.63	.....
1913.								
1	42.0	2.60	.52	.34	.32	.36	.31	.....
2	42.0	2.90	.47	.76	.32	.36	.31	.....
3	42.0	2.80	.60	.47	.32	.36	.31	.....
4	42.0	2.20	.75	.47	.32	.36	.31	.....
5	42.0	1.85	.69	.42	.32	.36	.32	.....
6	42.0	1.65	.69	.42	.32	.36	.32	.....
7	95.0	.30	.66	.38	.34	.36	.32	.....
8	82.0	1.11	.60	.38	.34	.36	.32	.....
9	120.0	.86	.60	.36	.36	.36	.32	.....
10	153.0	.76	.57	.38	.34	.31	.32	.....
11	86.0	.69	.57	.38	.34	.32	.32	.....
12	88.0	.69	.57	.40	.34	.30	.32	.....
13	108.0	.90	.57	.52	.34	.30	.32	.....
14	88.0	6.30	.57	.40	.36	.30	.32	.....
15	78.0	19.90	.57	.34	.36	.30	.32	.....
16	72.0	17.00	.57	.32	.36	.30	.32	.....
17	51.0	8.20	.57	.31	.36	.30	.32	.....
18	43.0	9.70	.57	.32	2.40	.30	.32	.....
19	27.0	6.30	2.50	.32	1.25	.30	.34	.....
20	23.0	3.90	2.80	.32	.38	.30	.34	.....
21	18.8	1.85	3.20	.32	.38	.30	.34	.....
22	15.5	1.50	3.40	7.40	.36	.30	.34	.....
23	14.3	1.04	3.40	1.70	.36	.30	.34	.....
24	11.2	.76	1.04	.82	.36	.30	.34	.....
25	10.3	.66	.82	.47	.38	.30	.34	.....
26	7.6	.60	.79	.44	.38	.30	.34	.....
27	7.2	.60	2.60	.38	.38	.30	.34	.....
28	6.3	.54	9.70	.34	.38	.31	.34	.....
29	5.9	.54	.42	.34	.36	.31	.34	.....
30	4.6	.54	.40	.34	.36	.31	.34	.....
31	.....	.52	.....	.32	.36	.....	.34	.....

a Interpolated.

Daily discharge, in second-feet, of Middle Creek, at MacKinnon's ranch, Alta., 1910–1915—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1914.								
1	.....	67.00	1.21	0.37	0.36	0.31	0.25	0.25
2	.....	62.00	.85	.37	.34	.31	.25	.25
3	.....	64.00	.45	.37	.33	.31	.25	.48
4	.....	64.00	.58	.37	.33	.31	.25	.38
5	.....	82.00	.58	.37	.33	.31	.26	.52
6	.....	88.00	.52	.60	.33	.31	.26	.52
7	.....	44.00	.50	.97	.37	.31	.26	.52
8	.....	47.00	.50	.52	.37	.31	.26	4.70
9	.....	52.00	.52	.45	.37	.45	.26	.55
10	.....	31.00	.40	.45	.85	.45	.26	.52
11	.....	36.00	12.00	.48	.85	.45	.26	.48
12	.....	[a] 48.00	4.70	.52	.85	.42	.26	.42
13	.....	60.00	1.38	.85	.85	.42	.26	.40
14	.....	46.00	.52	.65	.85	.42	.28	.38
15	.....	47.00	.93	.52	.85	.42	.28	.38
16	57	[a] 42.00	.85	.40	.85	.42	.28	.37
17	34	37.00	.58	.38	.81	.42	.28	.37
18	48	32.00	.55	.38	.81	.42	.28	.37
19	.....	27.00	.55	.38	.81	.42	.28	.37
20	.....	16.80	.55	.37	.81	.42	.26	.37
21	.....	33.00	.52	.37	.81	.42	.29	.38
22	.....	15.50	.52	.37	.81	.42	.26	.38
23	.....	11.20	.50	.37	.81	.38	.31	.38
24	.....	12.00	.50	.37	.81	.33	.34	.38
25	.....	16.10	.50	.52	.69	.34	.37	.38
26	.....	11.20	.50	.45	.69	.28	.38	.38
27	.....	4.70	.50	.45	.69	.26	.33	.38
28	.....	3.80	.45	.40	.69	.25	.25	.38
29	.....	2.40	.42	.40	.69	.25	.25	.38
30	.....	1.72	.40	.38	.37	.25	.25	.38
31	.....	.....	.37	.....	.31	.25	.....	.38

Day.	Mar.	Apr.	Day.	Mar.	Apr.	Day.	Mar.	Apr.
1915.			1915.			1915.		
1	.....	50.0	11	.....	9.8	21	.....	.....
2	.....	68.0	12	.....	6.8	22	67	.....
3	.....	152.0	13	.....	4.2	23	68	.....
4	.....	122.0	14	.....	2.4	24	115	.....
5	.....	128.0	15	.....	7.3	25	86	.....
6	.....	127.0	16	.....	6.2	26	66	.....
7	.....	28.0	17	.....	4.2	27	40	.....
8	.....	22.0	18	.....	.....	28	44	.....
9	.....	15.1	19	.....	.....	29	42	.....
10	.....	11.7	20	.....	.....	30	39	.....
						31	32	.....

[a] Estimated.

NOTE.—1911: Shifting control June 12 to Aug. 11.
1912: Shifting control Aug. 1 to Nov. 15.
1914: Stage-discharge relation affected by ice Mar. 19–31; discharge not determined.

Monthly discharge of Middle Creek, at MacKinnon's ranch, Alta., 1910–1915.

[Drainage area, 116 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1910.						
June 21–30	0.44	0.31	0.38	0.0030	0.0011	
July	1.45	.20	.44	.0035	.0040	27
August	.34	.18	.23	.0018	.0021	14
September	.39	.20	.25	0020	.0022	16
October	.24	.20	.22	.0017	.0020	13
November	.22	.17	.20	.0016	.0018	12
December	.17	.15	.17	.0013	.0015	10
The period						100
1911.						
April	156.0	2.2	18.6	.151	.168	1,107
May	3.8	.7	1.1	.009	.010	68
June	39.0	.5	4.8	.038	.042	286
July	60.0	.5	5.1	.041	.047	314
August	25.0	.4	1.4	.011	.013	80
September	128.0	.4	8.4	.068	.076	500
October	1.0	.8	.9	.007	.008	55
November 1–15	.9	.8	.8	.007	.004	24
The period					.368	2,434
1912.						
May	25.80	2.00	11.58	.094	.11	712
June	2.72	.68	1.21	.010	.01	72
July	.92	.40	.70	.0057	.006	43
August	.53	.40	.45	.0036	.004	28
September	.59	.47	.53	.0043	.005	32
October	.63	.58	.59	.0048	.006	36
November 1–15	.61	.61	.61	.0049	.003	18
The period					.14	941
1913.						
April	153.00	4.60	48.90	.398	.440	2,910
May	19.90	.52	3.25	.026	.030	200
June	9.70	.40	1.39	.011	.010	83
July	7.40	.31	.67	.005	.006	41
August	2.40	.32	.45	.004	.005	27
September	.36	.30	.33	.003	.003	20
October	.34	.31	.33	.003	.003	20
The period					.497	3,301
1914.						
March 16–18	57.00	34.00	46.00	.382	.040	275
April	88.00	1.72	37.00	.304	.340	2,202
May	12.00	.37	1.09	.009	.010	67
June	1.60	.37	4.90	.004	.004	29
July	.85	.31	.64	.005	.006	39
August	.45	.25	.36	.003	.003	22
September	.38	.25	.28	.002	.003	16
October	4.70	.25	.54	.004	.005	33
The period					.410	2,683
1915.						
March 22–31	115	32.0	.60	.498	.18	1,188
April 1–17	152	2.4	45	.371	.23	1,517
The period					.41	2,705

NOTE.—Area used in these tables is the same as published in the Canadian hydrometric reports, which was changed from time to time as more definite information of the drainage basin was obtained.

Mean monthly discharge, in second-feet, of Middle Creek at MacKinnon's ranch, Alta., 1910–1915.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total in acre-feet.
1910	.....	.....	.....	[a] 0.38	0.44	[a] 0.2	0.25	0.22	0.20	0.17	[a] 100
1911	.....	18.6	1.10	4.80	5.10	1.40	8.40	.90	[b] .80	.....	2,458
1912	.....	.....	11.60	1.21	.70	.45	.53	.59	[b] .60	.....	[a] 959
1913	.....	49.0	3.20	1.39	.67	.45	.33	.33	.....	.....	3,301
1914	[a] 46	37.0	1.09	4.90	.64	.36	.28	.54	.....	.....	2,683
1915	[a] 60	[a] 45.0	.....	.....	.....	.....	.....	.....	.....	.....	[a] 2,705
Average	.....	35	4.2	3.1	1.51	.58	1.96	.52	.53	.17	2,814
Average run-off, acre-feet	.....	2,083	258	184	93	36	117	32	32	10	2,845
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	25

[a] Incomplete record not included in average.
[b] Average for part of month assumed as monthly average.

MIDDLE CREEK AT ROSS'S RANCH, SASK.

LOCATION.—In SW. ¼ sec. 30, T. 5, R. 29 W. third meridian, at Maurice Ross's ranch, about 3 miles southwest of traffic bridge over Battle Creek at Tenmile Police Detachment and about 43 miles southwest of Maple Creek.

DRAINAGE AREA.—156 square miles.

RECORDS AVAILABLE.—Open-water records July 20, 1909, to October 31, 1917.

GAGE.—Vertical staff, nailed to a post near left bank and firmly stayed; read by Mrs. W. M. Ross.

DISCHARGE MEASUREMENTS.—Made by wading or with weir.

CHANNEL AND CONTROL.—Bed of creek sand and coarse gravel. Right bank high; is overflowed only during extremely high stages; left bank high; subject to overflow during high stages. One channel at ordinary stages, two channels during high stages.

EXTREMES OF STAGE.—1909–1917: Maximum stage recorded, 6.85 feet, April 5, 1912; (discharge, 1,688 second-feet) minimum stage recorded, 0.60 foot, July 24 to July 28, 1914 (discharge, 0.11 second-foot).

ICE.—Observations discontinued during winter season. Stage-discharge relation sometimes affected by ice during flood periods in the spring.

REGULATION.—The flow past this station is regulated to some extent by two dams, one at W. Wright's ranch and the other at A. MacKinnon's ranch.

ACCURACY.—Stage-discharge relation permanent during ordinary and low stages. Gage read to hundredths daily during high water and once daily during remainder of season. Daily discharge obtained by applying mean daily gage height to rating tables. Records fair.

Discharge measurements of Middle Creek at Ross's ranch, Sask., 1909–1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1909.		*Feet.*	*Sec.-ft.*	1914.		*Feet.*	*Sec.-ft.*
June 16	H. R. Carscallen	.....	0.51	June 5	H. W. Rowley	0.71	0.53
July 1	do	.....	2.15	July 9	do	.67	.31
20	do	0.78	.39	Sept. 2	do	.65	.25
Aug. 9	do	.76	.33	Oct. 5	do	.66	.52
Sept. 8	do	.79	.39	22	do	.62	.29
29	do	.825	.57				
Nov. 4	do	.75	.13	1915.			
				Mar. 22	H. R. Carscallen	3.41	81.00
1910.				23	do	3.64	145.00
Apr. 22	H. R. Carscallen	.73	.83	27	do	3.33	144.00
May 16	do	.66	.48	Apr. 1	do	1.97	40.00
June 10	do	.65	.40	3	do	2.88	101.00
July 2	do	.66	.27	5	do	4.77	425.00
25	do	.66	.30	9	do	1.74	26.00
Aug. 12	do	.64	.27	20	H. W. Rowley	.74	.81
Sept. 3	do	.66	.33	26	do	.67	.58
Sept. 29	R. G. Swan	.68	.39	May 10	do	.65	.49
Oct. 25	do	.64	.36	June 7	do	.67	.44
				26	do	.67	.44
1911.				28	do	.64	.22
Apr. 24	M. H. French	.72	2.01	July 21	do	.90	2.10
May 20	do	.51	.37	Aug. 17	do	.64	.22
June 12	do	.54	.28	18	do	3.38	148.00
July 20	do	.56	.33	Sept. 10	do	.64	.39
Sept. 1	do	.57	.32	Oct. 4	do	.64	.40
7	do	2.36	60.64				
8	do	2.68	81.25	1916.			
30	do	.60	.49	Mar. 28	P. A. Fetterley	2.90	112.00
				30	do	2.39	65.00
1912.				Apr. 1	do	1.54	27.00
Apr. 11	M. H. French	5.46	721.30	5	do	1.30	15.30
30	do	1.28	19.82	7	do	1.10	9.10
May 31	G. R. Elliott	1.19	14.56	11	do	1.51	29.00
July 10	do	.56	.25	14	do	1.50	28.00
30	do	.56	.25	25	H. W. Rowley	.69	1.58
Nov. 4	do	.53	.23	May 10	do	.64	*a* .66
				29	do	1.50	26.00
1913.				30	do	1.90	44.00
Apr. 18	H. D. St. A. Smith	2.48	59.30	June 22	do	.75	*a* .92
June 3	do	.74	.56	July 18	do	.73	*a* 1.01
25	do	.63	.74	Aug. 8	do	.70	*a* .78
July 18	do	.60	.20	28	do	.69	*a* .63
Aug. 14	do	.65	.86	Sept. 22	do	.68	*a* .58
Sept. 12	do	.62	.24	Oct. 12	do	.68	*a* .63
Oct. 7	do	.63	.24	Nov. 10	do	.72	*a* .52
1914.				1917.			
Mar. 23	H. R. Carscallen	.88	3.00	Apr. 6	H. W. Rowley	.57	1.71
Apr. 4	do	1.06	5.90	9	do	3.64	51.00
7	do	2.42	60.00	25	do	2.87	116.00
8	do	3.46	147.00	May 8	do	4.01	285.00
11	do	1.99	40.00	June 15	A. T. Gardner	.75	2.60
24	do	1.21	11.00	Nov. 26	H. W. Rowley	.70	.57
27	H. W. Rowley	1.01	4.60				

a Measured by weir.

Daily discharge, in second-feet, of Middle Creek at Ross's ranch, Sask., 1909–1917.

Day.	July.	Aug.	Sept.	Oct.	Nov.	Day.	July.	Aug.	Sept.	Oct.	Nov.
1909.						1909.					
1	.....	0.36	0.36	0.36	0.36	16	.....	0.36	0.36	0.36	.....
2	.....	.36	.36	.36	.36	17	.....	.36	.36	.36	.....
3	.....	.36	.36	.36	.36	18	.....	.36	.36	.36	.....
4	.....	.36	.36	.36	.36	19	.....	.36	.36	.36	.....
5	.....	.36	.36	.36	.36	20	0.46	.36	.36	.36	.....
6	.....	.36	.36	.36	.36	21	.46	.36	.36	.36	.....
7	.....	.36	.36	.36	.36	22	.46	.36	.36	.36	.....
8	.....	.36	.36	.36	.36	23	.15	.36	.36	.36	.....
9	.....	.36	.36	.36	.36	24	.15	.36	.36	.36	.....
10	.....	.36	.36	.36	.36	25	.46	.36	.36	.36	.....
11	.....	.36	.36	.36	.36	26	.90	.36	.36	.36	.....
12	.....	.36	.36	.36	.36	27	.90	.36	.36	.36	.....
13	.....	.36	.36	.36	.36	28	.90	.36	.36	.36	.....
14	.....	.36	.36	.36	.36	29	.46	.36	.36	.36	.....
15	.....	.36	.36	.36	.....	30	.46	.36	.36	.36	.....
						31	.46	.36	.....	.36	.....

Daily discharge, in second-feet, of Middle Creek at Ross's ranch, Sask., 1909–1917—Con.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1910.								
1	.....	0.54	0.35	0.76	0.32	0.46	0.43	.....
2	.....	.54	.35	.54	.29	.39	.43	.....
3	.....	.54	.35	.54	.29	.39	.43	.....
4	.....	.54	.35	.54	.29	.39	.43	.....
5	0.54	.54	.35	.54	.35	.46	.43	.....
6	.54	.54	.35	.54	.39	.50	.43	.....
7	.54	.54	.35	.54	.50	.50	.43	.....
7	1.00	.54	.35	.54	.43	.50	.43	.....
9	1.00	.54	.35	.54	.39	.46	.43	.....
10	1.00	.54	.35	.54	.39	.43	.43	.....
11	1.00	.54	.35	.54	.35	.43	.43	.....
12	1.00	.54	.35	.54	.35	.43	.43	.....
13	1.00	.54	.35	.54	.43	.39	.43	.....
14	1.00	.54	.35	.54	.43	.39	.43	.....
15	.54	.54	.35	.54	.54	.39	.43	.....
16	.54	.35	.35	.54	.54	.39	.43	.....
17	.54	.35	1.00	.54	.54	.39	.43	.....
18	.54	.35	.54	.54	.50	.39	.43	.....
19	3.58	.54	.35	.54	.46	.43	.43	.....
20	3.06	.54	.35	.54	.46	.43	.43	.....
21	2.02	.54	.35	.54	.46	.43	.43	.....
22	1.00	.35	.35	.54	.46	.43	.43	.....
23	.54	.35	.35	.54	.46	.43	.43	.....
24	.54	.35	.35	.54	.46	.43	.43	.....
25	.54	.35	.35	.35	.46	.43	.43	.....
26	.54	.35	.35	.35	.43	.43	.43	.....
27	.54	.35	.35	.35	.43	.43	.39	.....
28	.54	.35	.35	.54	.46	.43	.35	.....
29	.54	.35	.35	.43	.46	.43	.32	.....
30	.54	.35	.76	.39	.46	.43	.32	.....
31	.....	.35	.....	.39	.46	.....	.32	.....
1911.								
1	.....	6.1	.3	12.0	.4	.4	.4	0.5
2	.....	5.7	.3	7.2	.4	.4	.5	.5
3	.....	1.3	.3	3.5	.4	.4	.5	.5
4	.....	.5	.3	30.0	.4	2.3	.5	.5
5	.....	.5	.3	26.0	.4	9.6	.5	.5
6	.....	.4	.3	17.0	.5	107.0	.5	.5
7	.....	19.0	.3	9.6	.5	61.0	.5	.5
8	.....	12.0	.3	4.9	.5	82.0	.5	.5
9	.....	12.0	.3	1.3	.5	57.0	.5	.....
10	.....	12.0	.3	.5	.5	40.0	.5	.....
11	1.7	12.0	.3	.5	5.0	16.0	.5	.....
12	7.2	5.0	.3	.4	2.3	5.0	.5	.....
13	[a]114.0	2.3	.3	.4	1.3	3.5	.5	.....
14	40.0	.5	.3	.4	.6	2.9	.5	.....
15	12.0	.4	.3	.4	.5	2.4	.5	.....
16	2.2	.4	.3	.4	.5	1.7	.5	.....
17	2.2	.4	.3	.4	.4	.5	.5	.....
18	2.2	.4	.3	.4	.4	.5	.5	.....
19	2.3	.3	.3	.4	.4	.5	.5	.....
20	3.5	.3	.3	.4	.4	.5	.5	.....
21	12.0	.3	.4	.4	.4	.5	.5	.....
22	116.0	.3	.5	.4	.4	.5	.5	.....
23	26.0	.4	.5	.4	.4	.5	.5	.....
24	3.5	.3	.5	.4	.4	.5	.5	.....
25	5.4	.3	.5	.4	.4	.5	.5	.....
26	6.1	.3	.6	.4	.4	.5	.5	.....
27	6.1	.3	.6	.4	.4	.5	.5	.....
28	6.5	.3	.7	.4	.4	.5	.5	.....
29	7.0	.3	4.2	.4	.4	.5	.5	.....
30	9.6	.4	7.4	.4	.4	.5	.5	.....
31	.....	.3	.....	.4	.4	.....	.5	.....

[a] Sudden rise due to failure of dikes at Wright's ranch.

Daily discharge, in second-feet, of Middle Creek at Ross's ranch, Sask., 1909–1917—Con.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1912.								
1	.....	15.47	9.35	0.30	0.30	0.45	0.40	0.24
2	.....	17.42	2.83	.30	.35	.45	.40	.24
3	.....	17.42	1.58	.40	.45	.45	.40	.24
4	.....	15.08	.89	.30	.45	.50	.40	.23
5	1,688	10.50	.30	.30	.40	.50	.40	.23
6	1,190	7.52	.30	.35	.40	.50	.40	.23
7	1,056	6.40	.30	.30	.35	.50	.40	.23
8	1,056	6.68	.30	.40	.35	.50	.40	.23
9	900	6.68	.30	.35	.35	.50	.40	.22
10	770	8.42	.30	.30	.35	.45	.40	.22
11	695	9.35	.30	.30	.35	.45	.40	.22
12	560	6.68	.30	.30	.35	.45	.40	.22
13	280	5.68	.30	.30	.30	.45	.40	.22
14	104	5.20	.30	.30	.30	.45	.40	.22
15	58	4.98	1.10	.30	.30	.45	.40	.22
16	45.09	2.65	.89	.30	.30	.45	.40	.....
17	45.09	2.65	.69	.30	.30	.45	.40	.....
18	52.00	2.01	.30	.35	.30	.40	.40	.....
19	48.00	1.87	.30	.35	.40	.40	.40	.....
20	44.26	1.72	.30	.35	.40	.40	.40	.....
21	40.96	1.58	.30	.35	.40	.40	.40	.....
22	39.32	1.46	.30	.35	.40	.40	.40	.....
23	37.68	1.34	.30	.30	.40	.40	.35	.....
24	31.94	1.34	.30	.30	.40	.40	.35	.....
25	27.46	.98	.30	.30	.40	.45	.35	.....
26	24.22	.98	.30	.30	.45	.40	.35	.....
27	22.20	.98	.30	.30	.45	.40	.35	.....
28	15.86	.89	.30	.30	.45	.40	.35	.....
29	14.30	.89	.30	.30	.45	.40	.30	.....
30	19.00	.69	.30	.30	.45	.40	.30	.....
31	.....	6.96	.....	.30	.50	.....	.25	.....
1913.								
1	.....	.47	.28	.35	.30	.28	.28	.....
2	.....	.44	.28	.38	.28	.28	.28	.....
3	.....	.41	.28	.38	.28	.28	.28	.....
4	.....	.35	.28	.35	.28	.28	.28	.....
5	.....	.28	.28	.32	.32	.28	.28	.....
6	.....	.25	.28	.30	.32	.28	.28	.....
7	.....	.21	.28	.30	.32	.28	.25	.....
8	.....	.25	.28	.30	.32	.28	.25	.....
9	188.00	.30	.28	.28	.32	.28	.25	.....
10	203.00	.38	.28	.28	.30	.28	.25	.....
11	220.00	.35	.28	.28	.30	.28	.23	.....
12	203.00	.32	.28	.28	.30	.28	.25	.....
13	197.00	.32	.30	.28	.30	.28	.25	.....
14	178.00	.30	.30	.28	.30	.28	.25	.....
15	168.00	.28	.30	.28	.30	.28	.25	.....
16	148.00	.25	.28	.28	.30	.28	.25	.....
17	72.00	.23	.28	.28	.30	.28	.25	.....
18	65.00	.23	.28	.28	.20	.28	.25	.....
19	42.00	.28	.28	.28	.84	.28	.23	.....
20	38.00	1.50	.32	.28	.68	.28	.23	.....
21	41.00	3.30	.38	.28	.50	.28	.25	.....
22	40.00	2.20	.38	.84	.47	.28	.25	.....
23	35.00	1.16	.35	.84	.38	.28	.25	.....
24	26.00	.38	.32	.76	.35	.28	.25	.....
25	8.00	.32	.28	.68	.30	.28	.25	.....
26	3.90	.32	.28	.68	.30	.28	.25	.....
27	2.30	.28	.28	.60	.30	.28	.25	.....
28	1.24	.28	.28	.60	..2	.28	.25	.....
29	.53	.28	.30	.47	.28	.28	.25	.....
30	.50	.28	.32	.35	.28	.28	.25	.....
31	.....	.28	.....	.32			.25	.....

Daily discharge, in second-feet, of Middle Creek at Ross's ranch, Sask., 1909–1917—Con.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1914.								
1	.....	a 4.70	0.56	0.34	0.34	0.22	0.25	0.22
2	.....	a 19.00	.34	.34	.34	.15	.25	.22
3	.....	66.00	.56	.34	.34	.15	.25	.25
4	.....	11.00	.56	.34	.34	.15	.25	.45
5	.....	13.30	.51	.39	.34	.18	.25	.51
6	.....	73.00	.34	.51	.34	.18	.25	.45
7	.....	54.00	.34	.56	.34	.18	.25	.29
8	.....	139.00	.34	.51	.34	.18	.25	.67
9	.....	85.00	.34	.34	.34	.18	.25	.34
10	.....	37.00	.34	.34	.34	.18	.25	.29
11	.....	36.00	.34	.56	.34	.22	.29	.25
12	.....	33.00	.34	.56	.34	.22	.34	.22
13	.....	38.00	.34	.85	.34	.22	.39	.22
14	.....	103.00	.34	.85	.34	.22	.34	.22
15	30.00	123.00	.34	.51	.34	.22	.29	.22
16	a 29.00	108.00	.34	.34	.34	.22	.29	.22
17	a 27.00	95.00	.34	.34	.34	.25	.29	.22
18	a 26.00	74.00	.34	.34	.34	.25	.25	.22
19	a 25.00	48.00	.34	.34	.29	.34	.25	.22
20	a 23.00	24.00	.34	.34	.29	.29	.25	.22
21	22.00	4.10	.34	.34	.25	.25	.25	.22
22	2.80	4.30	.34	.34	.18	.25	.22	.34
23	2.40	11.70	.34	.34	.18	.25	.22	.56
24	1.25	9.60	.45	.34	.11	.25	.22	.56
25	a .94	9.30	.34	.51	.11	.34	.22	.56
26	a .94	2.90	.34	.45	.11	.25	.22	.56
27	a .94	2.60	.34	.34	.11	.25	.22	.56
28	a 1.46	2.00	.34	.34	.11	.25	.22	.56
29	a 1.46	1.36	.34	.34	.22	.25	.22	.56
30	a 2.90	.86	.34	.34	.34	.25	.22	.56
31	a 4.70	.....	.34	.....	.25	.25	.....	.56
1915.								
1	.....	45.00	a .46	.71	.33	.41	.24	.37
2	.....	57.00	a .46	1.38	.33	.41	.33	.37
3	.....	431.00	a .46	2.40	.33	.33	.41	.37
4	.....	440.00	a .46	1.65	.33	.33	.33	.37
5	.....	381.00	a .46	.59	.33	.33	.33	.37
6	.....	196.00	a .46	.50	.33	.33	.33	.37
7	.....	131.00	a .46	.46	1.38	.33	.33	.37
8	.....	67.00	a .46	.46	1.02	.33	.33	.37
9	.....	25.00	a .46	.46	.37	.33	.33	.37
10	.....	16.20	a .46	.46	.33	.28	.33	.37
11	.....	12.90	.46	.46	.33	.19	.33	.37
12	.....	11.10	.46	.50	.33	.15	.41	.37
13	.....	6.90	.50	.46	.33	.15	.33	.37
14	.....	4.60	.59	.46	12.60	.15	.46	.37
15	.....	3.40	.96	.46	17.00	.15	.41	.37
16	.....	3.40	.71	.46	3.30	.15	.37	.37
17	.....	3.40	.55	.50	3.60	.15	.33	.27
18	.....	3.40	.50	.46	11.10	121.00	.37	.37
19	.....	3.20	.46	.50	7.50	26.00	.37	.37
20	.....	.77	.46	.50	5.50	129.00	.37	.37
21	50	.59	.46	.46	2.40	97.00	.37	.37
22	81	.55	.46	.46	1.74	32.00	.37	.37
23	145	.55	.46	.46	.96	19.00	.37	.37
24	203	.55	.46	.46	.89	2.70	.37	.37
25	301	.55	.46	.46	.77	.96	.37	.37
26	256	.46	.50	.50	.71	.59	.37	.37
27	115	.46	.50	.33	.59	.33	.37	.37
28	65	a .46	.46	.33	.59	.28	.37	.33
29	43	a .46	.59	.41	.59	.24	.37	.33
30	25	a .46	.50	.33	.71	.24	.37	.33
31	46	.....	.59	.....	.59	.24	.....	.33

a Interpolated.

Daily discharge, in second-feet, of Middle Creek at Ross's ranch, Sask., 1909–1917—Con.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1916.								
1	.....	30.00	0.52	87.00	1.34	4.10	0.80	0.60
2	134	25.00	.44	34.00	1.70	1.70	.80	.60
3	111	23.00	.44	16.40	4.10	1.34	.80	.60
4	63	17.70	.44	4.90	77.00	1.10	.80	.60
5	57	16.80	.44	5.80	174.00	1.10	1.00	.70
6	a 71	14.40	.44	4.90	97.00	1.00	1.10	.70
7	a 85	9.40	.44	4.30	a 79.00	1.00	.90	.80
8	111	7.40	.44	23.00	a 60.00	.80	.80	.80
9	105	5.10	.52	34.00	42.00	1.34	.80	.70
10	131	5.10	.52	6.30	36.00	47.00	.80	.63
11	318	23.00	.52	5.10	5.10	24.00	.80	.63
12	796	37.00	.44	68.00	3.90	7.10	.80	.63
13	654	30.00	.52	155.00	1.34	5.10	.80	.63
14	364	23.00	.52	69.00	1.00	1.98	.80	.63
15	322	20.00	.52	23.00	.90	1.22	.80	.....
16	192	6.10	.52	15.60	.90	1.98	.80	.....
17	137	16.00	.52	5.60	.90	1.98	.80	.....
18	89	10.10	.52	3.90	1.00	1.00	.80	.....
19	100	4.10	.60	1.70	43.00	1.00	.80	.....
20	101	3.70	.70	1.22	69.00	.90	.80	.....
21	270	2.40	.70	1.00	29.00	.90	.80	.....
22	292	2.10	.70	.90	12.90	.90	.58	.....
23	268	1.84	.70	.90	6.60	.90	.80	.....
24	184	1.58	.80	.90	4.10	.90	.80	.....
25	60	1.10	1.58	.90	2.10	.90	.80	.....
26	58	.70	13.30	.90	1.22	.90	.70	.....
27	67	.44	3.60	.90	1.22	.90	.70	.....
28	130	.44	4.70	.90	1.10	.63	.60	.....
29	70	.36	98.00	11.82	17.70	.80	.60	.....
30	73	.36	47.00	1.98	11.10	.80	.60	.....
31	38	.....	145.00	.....	6.60	.80	.....	.....
1917								
1	.....	a 1.00	54.0	9.20	.94	.24	.48	1.28
2	.....	a 1.10	64.0	7.80	.94	.24	.60	1.28
3	.....	a 1.30	67.0	7.20	.94	.24	.60	1.28
4	.....	a 1.40	99.0	6.40	.94	.24	.60	1.62
5	.....	a 1.60	115.0	6.10	.94	.24	.60	1.62
6	.....	1.71	200.0	5.00	.94	.24	.60	1.62
7	.....	17.00	202.0	6.80	.94	.36	.60	1.62
8	.....	27.00	287.0	2.60	.94	.48	.94	1.62
9	.....	51.00	287.0	2.60	.94	.48	2.30	1.62
10	.....	31.00	260.0	2.60	.94	.48	2.30	1.62
11	.....	265.00	400.0	3.30	.94	.48	2.30	1.62
12	.....	305.00	373.0	3.70	.94	.48	2.30	1.62
13	.....	364.00	214.0	3.30	.94	.48	2.30	1.62
14	.....	526.00	108.0	a 2.80	.94	.48	2.30	1.62
15	.....	609.00	114.0	2.30	.94	.48	2.60	1.62
16	.....	558.00	96.0	a 2.65	.94	.36	2.60	1.62
17	.....	393.00	74.0	3.00	.94	.36	2.60	1.62
18	.....	294.00	56.0	2.60	.94	.36	2.60	1.62
19	.....	371.00	32.0	2.30	.94	.36	2.60	1.62
20	.....	393.00	28.0	2.30	.94	.36	2.60	1.62
21	.....	526.00	22.0	2.30	.94	.36	2.60	1.62
22	.....	528.00	20.0	1.96	.94	.36	2.60	1.62
23	.....	555.00	15.9	1.96	.94	.36	2.60	1.62
24	.....	447.00	15.9	1.96	.94	.36	3.00	1.62
25	.....	285.00	15.9	1.62	.94	.36	3.30	1.62
26	.....	141.00	15.6	1.62	.94	.36	3.00	1.62
27	.....	199.00	15.6	1.62	.94	.36	2.30	1.62
28	.....	170.00	15.2	1.28	.94	.36	1.62	1.62
29	.....	57.00	14.2	.94	.60	.36	1.28	1.62
30	.....	63.00	12.0	.94	.24	.36	1.28	1.62
31	.....	.....	a 10.6	.....	.24	.48	.....	1.62

a Estimated.

NOTE.—1912: Stage-discharge relation affected by ice Apr. 1–4; discharge not determined.
1913: Stage-discharge relation affected by ice Apr. 1–8; discharge not determined.
1915: Stage-discharge relation affected by ice Mar. 21–26.
1916: Shifting control June 17 to Oct. 14. Creek still running but no observations after Oct. 14.
1917: Stage-discharge relation affected by ice Apr. 6–15.

Monthly discharge of Middle Creek at Ross's ranch, Sask., 1909–1917.

[Drainage area, 156 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1909.						
July 20–31	0.90	0.15	0.52	0.003	0.001	12
August	.36	.36	.36	.002	.003	22
September	.36	.36	.36	.002	.002	21
October	.36	.36	.36	.002	.003	22
November 1–14	.36	.36	.36	.002	.001	10
The period						87
1910.						
April 5–30	3.58	.54	.95	.006	.004	49
May	.54	.35	.46	.003	.003	28
June	1.00	.35	.39	.002	.002	23
July	.76	.35	.52	.003	.003	32
August	.54	.29	.43	.003	.003	26
September	.50	.39	.43	.003	.003	25
October	.43	.32	.42	.002	.002	25
The period						208
1911.						
April 11–30	116.0	1.7	19.3	.112	.083	766
May	19.0	.3	3.1	.018	.021	191
June	7.4	.3	.7	.004	.004	42
July	30.0	.4	3.9	.023	.025	240
August	5.0	.4	.7	.004	.005	43
September	107.0	.4	13.3	.077	.086	791
October	.5	.5	.5	.003	.004	31
November 1–8	.5	.5	.5	.003	.001	8
The period					.229	2,112
1912.						
April 5–30	1,688	14.30	340.94	1.97	1.91	17,582
May	17.42	.69	5.56	.032	.037	342
June	9.35	.30	.81	.0047	.005	48
July	.40	.30	.32	.0018	.002	20
August	.50	.30	.38	.0022	.002	23
September	.50	.40	.44	.0025	.003	26
October	.40	.25	.38	.0022	.002	23
November 1–15	.24	.22	.23	.0013	.002	7
The period					1.96	18,071
1913.						
April 9–30	220.00	.50	85.50	.495	.405	3,731
May	3.30	.21	.53	.003	.004	33
June	.38	.28	.30	.002	.002	18
July	.84	.28	.40	.002	.002	24
August	2.20	.28	.41	.002	.002	25
September	.28	.28	.28	.002	.002	17
October	.28	.23	.25	.002	.002	15
The period					.419	3,863
1914.						
March 15–31	30.00	.94	11.90	.0735	.050	400
April	139.00	.86	41.00	.2540	.280	2,446
May	.56	.34	.37	.0023	.003	23
June	.85	.34	.42	.0026	.003	25
July	.34	.11	.28	.0017	.002	17
August	.34	.15	.23	.0014	.002	14
September	.39	.22	.26	.0016	.002	15
October	.67	.22	.37	.0023	.003	23
The period					.34	2,963
1915.						
March 21–31	301 00	25.00	121.00	.74700	.310	2,637
April	440.00	.46	62.00	.38300	.430	3,689
May	.96	.46	.51	.00315	.004	31
June	2.40	.33	.60	.00370	.004	36
July	17.00	.33	2.50	.01540	.020	154
August	129.00	.15	14.00	.08640	.100	861
September	.83	.24	.37	.00228	.003	23
October	.37	.33	.36	.00222	.003	22
The period					.87	7,453

Monthly discharge of Middle Creek at Ross's ranch, Sask., 1909–1917—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1916.						
March 2–31	796.00	38.00	182.00	1.120	1.25	10,830
April	37.00	.36	11.30	.070	.08	672
May	145.00	.44	10.50	.065	.07	646
June	155.00	.90	19.70	.122	.14	1,172
July	174.00	.90	26.00	.160	.18	1,599
August	47.00	.63	3.70	.023	.03	228
September	1.10	.58	.79	.005	.01	47
October 1–14	.80	.60	.66	.004	0	18
The period					1.76	15,212
1917.						
April	609.00	1.00	239.00	1.530	1.71	14,221
May	400.00	10.60	110.00	.705	.81	6,764
June	9.20	.94	3.40	.022	.02	202
July	.94	.24	.88	.006	.01	54
August	.48	.24	.37	.002	.01	23
September	3.30	.48	1.93	.012	.01	115
October	1.62	1.28	1.59	.010	.01	98
The period					2.57	21,477

NOTE.—Area used in these tables is the same as published in the Canadian hydrometric reports, which was changed from time to time as more definite information of the drainage basin was obtained.

Mean monthly discharge, in second-feet, of Middle Creek at Ross's ranch, Sask., 1909–1917.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total in acre-feet.
1909	.....	.....	.....	.....	[a] 0.52	0.36	0.36	0.36	[b] 0.36	[a] 98
1910	.....	[c] 0.90	0.46	0.39	.52	.43	.43	.42	.....	213
1911	.....	[a] 19.30	3.10	.70	3.90	.70	13.30	.50	[a.] 50	2,112
1912	.....	[c] 303.00	5.60	.81	.32	.38	.44	.38	[b.] 23	18,526
1913	.....	[c] 80.00	.53	.30	.40	.41	.28	.25	.....	4,892
1914	[d] 6.50	41.00	.37	.42	.28	.23	.26	.37	.....	2,963
1915	[d] 43.00	62.00	.51	.60	2.50	14.00	.37	.36	.....	7,460
1916 [e]	[d] 176.00	11.30	10.50	19.70	26.00	3.70	.79	[a.] 66	.....	15,212
1917	[c] 1.00	239.00	110.00	3.40	.88	.37	1.93	1.59	.....	21,538
Average	57	105	16.4	3.3	4.4	2.3	2.00	.53	.30	9,114
Average run-off, acre-feet	3,505	6,248	1,008	196	270	141	119	33	18	11,538
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	74

[a] Incomplete record not included in average.
[b] Average for part of month assumed as monthly average.
[c] Estimated.
[d] Reduced to monthly average.
[e] Records published in report for 1916 have been revised.

MIDDLE CREEK AT HAMMOND'S RANCH, SASK.

LOCATION.—In NE. ¼ sec. 4, T. 2, R. 29 W. third meridian, at D. A. Hammond's ranch.

DRAINAGE AREA.—308 square miles.

RECORDS AVAILABLE.—Open-water periods March 14, 1911, to October 31, 1917.

GAGE.—Vertical staff, read by Mrs. K. R. Hammond. On March 25, 1916, gage was moved 850 feet north, to point 150 feet above artificial control.

DISCHARGE MEASUREMENTS.—Made from the irrigation flume just above gage during flood stages and by wading or with weir during low stages.

CHANNEL AND CONTROL.—Bed and banks practically permanent. Banks subject to overflow during extreme high water. Control is artificial wall of stones laid in cement 150 feet below gage.

EXTREMES OF STAGE.—1910–1917: Maximum stage recorded, 12 feet April 5, 1912 (discharge, 884 second-feet); no flow for short periods during each year of record.

ICE.—Stage-discharge relation affected by ice during flood periods in the spring. Observations discontinued during winter season.

DIVERSIONS.—Water is diverted from the stream above this station by a number of applicants for irrigation and by the Canadian Pacific Railway Co. at Govenlock for industrial uses.

ACCURACY.—Stage-discharge relation not permanent. Gage read daily to hundreds. Daily discharge determined from rating curves except for periods of ice effect, for which it was estimated. Record good.

REMARKS.—At the time of the establishment of this station, on July 20, 1910, and for the balance of that year, water was standing in pools but not flowing on the surface.

Discharge measurements of Middle Creek at Hammond's ranch, Sask., 1911–1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
1911.				1915.			
Apr. 20	M. H. French	1.94	7.94	Mar. 27	H. W. Rowley	5.42	203.00
May 17	do	1.50	1.70	31	do	[a] 4.19	88.00
Aug. 8	do	1.04	0	Apr. 5	do	7.10	422.00
July 7	do	2.71	24.30	9	do	3.43	63.00
Sept. 16	do	1.97	8.04	12	do	2.66	26.00
Oct. 23	do	1.40	.70	24	do	1.81	3.30
				May 22	do	1.55	[b] .12
1912.				June 22	do	1.44	[b] .06
Apr. 15	M. H. French	4.43	117.08	July 16	do	[a] 2.75	21.00
May 25	G. R. Elliott	1.72	2.69	Aug. 10	do	1.23	[c] .02
June 27	do	1.45	.....	Sept. 3	do	1.49	[b] 1.81
Aug. 6	do	.....	0	29	do	1.25	[b] .69
31	do	.....	0				
Oct. 12	do	1.01	0	1916.			
Nov. 8	do	.95	0	Mar. 25	H. W. Rowley	3.24	114.00
				Apr. 4	do	1.90	35.00
1913.				8	do	1.56	21.00
Apr. 22	H. D. St. A. Smith	3.30	43.60	11	do	1.41	17.80
May 12	do	1.79	3.66	15	do	1.79	42.00
June 14	do	1.43	.15	May 2	do	.60	3.80
July 11	do	1.34	.04	15	do	.45	1.66
Aug. 1	do	.....	0	June 7	do	1.20	13.60
28	do	.....	0	July 26	do	.80	8.90
Sept. 20	do	.....	0	Aug. 16	do	.54	4.70
Oct. 13	do	.....	0	Sept. 5	do	.18	.93
Nov. 5	do	.....	0	29	Newhall and Rowley	.13	.10
				Oct. 30	H. W. Rowley	.30	1.28
1914.							
Mar. 18	H. D. St. A. Smith	3.17	24.00	1917.			
21	do	2.32	8.70	Apr. 7	G. S. Wenden	2.10	36.00
30	do	2.07	5.20	17	do	7.68	658.00
Apr. 3	do	3.14	38.40	May 1	do	2.20	66.00
9	do	4.44	129.00	8	do	3.33	161.00
10	do	4.58	141.00	14	do	2.85	141.00
13	do	3.29	48.00	24	do	1.14	26.00
24	H. W. Rowley	2.06	9.00	30	do	.85	9.40
May 21	do	1.49	.10	June 22	P. A. Fotterley	.71	.92
25	do	1.46	.06	July 28	do	.....	0
June 17	do	1.29	0	Sept. 26	do	.....	0
July 15	do	Dry.	0	Nov. 13	do	.....	0
Aug. 26	do	Dry.	0				
Oct. 26	do	1.05	0				

[a] Gage height affected by backwater from Lodge Creek.
[b] Weir measurement.
[c] Estimated.

Daily discharge, in second-feet, of Middle Creek at Hammond's ranch, Sask., 1911–1917.

Day.	Mar.	Apr.	May.	June.	July.	Sept.	Oct.	Nov.
1911.								
1	.....	2.2	3.6	1.7	1.8	0	2.2	1.0
2	.....	2.2	4.6	1.7	1.8	0	2.2	1.0
3	.....	2.2	20.0	1.7	2.2	0	2.1	1.0
4	.....	2.2	13.0	1.6	33.0	4.0	2.1	1.0
5	.....	2.2	10.0	2.0	18.0	8.0	2.1	1.0
6	.....	4.2	11.0	1.8	13.0	452.0	2.0	1.0
7	.....	4.0	7.8	1.6	25.0	284.0	2.0	1.0
8	.....	1.0	5.5	1.0	15.0	195.0	1.9	1.0
9	.....	.8	5.5	.4	15.0	88.0	1.9	1.0
10	.....	.8	3.7	0	13.0	74.0	1.9	1.0
11	.....	1.2	1.2	0	12.0	66.0	1.8	1.0
12	.....	1.5	1.3	0	8.4	39.0	1.7	1.0
13	.....	3.7	0	0	5.6	18.0	1.6	1.0
14	0	3.8	1.2	0	4.3	17.0	1.5	1.0
15	0	4.3	1.6	0	3.0	16.0	1.4	1.0
16	0	[a] 24.0	1.8	0	2.6	9.0	1.4	1.0
17	0	24.0	2.2	0	2.6	6.6	1.3	1.0
18	0	16.0	2.1	0	2.3	5.4	1.3	1.0
19	0	8.2	2.1	0	2.2	4.0	1.2	1.0
20	0	7.8	2.1	11.0	2.1	3.8	1.2	1.0
21	0	5.5	2.0	11.0	1.7	3.7	1.1	.....
22	0	.6	2.0	7.0	1.4	3.5	1.1	.....
23	0	[a] 34.0	2.2	4.3	1.0	3.7	1.0	.....
24	0	24.0	2.2	4.0	.7	3.6	1.0	.....
25	14.0	10.0	2.1	2.7	0	3.5	1.0	.....
26	16.0	8.0	2.1	2.0	0	2.9	1.0	.....
27	10.0	7.0	2.1	2.0	0	2.8	1.0	.....
28	10.0	7.0	2.0	1.8	0	2.6	1.0	.....
29	10.0	8.6	1.5	1.8	0	2.5	1.0	.....
30	7.8	4.0	1.7	1.8	0	2.3	1.0	.....
31	8.2	.....	2.0	.....	0	.....	1.0	.....

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1912.					1912.				
1	.....	26.50	3.24	0.05	16	79.70	11.00	15.65	.....
2	.....	24.85	3.10	.05	17	79.70	10.00	14.11	.....
3	.....	23.25	2.84	.04	18	73.65	9.00	8.05	.....
4	.....	22.61	2.45	.03	19	73.65	8.05	4.87	.....
5	[b] 884	21.65	2.21	.03	20	70.70	8.05	3.24	.....
6	[b] 799	20.40	1.85	.02	21	62.15	7.86	2.21	.....
7	[b] 784	20.10	1.74	.02	22	54.10	7.10	1.41	.....
8	[b] 757	20.10	1.52	.01	23	49.20	6.20	1.03	.....
9	[b] 744	18.55	1.30	.01	24	42.60	5.35	.53	.....
10	[b] 744	18.55	1.21	.....	25	36.85	5.35	.39	.....
11	741	17.05	1.03	.....	26	29.85	5.03	.21	.....
12	[b] 500	15.65	.85	.....	27	29.17	4.87	.15	.....
13	[b] 299	14.35	.69	.....	28	28.15	4.87	.13	.....
14	[b] 144	13.15	.85	.....	29	28.15	4.55	.09	.....
15	117	12.05	7.10	.....	30	26.50	4.10	.07	.....
					31	.....	3.66	.....	.....

[a] Wright's dikes gave way.

[b] Discharge estimated.

Daily discharge, in second-feet, of Middle Creek at Hammond's ranch, Sask., 1911–1917—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Day.	Apr.	May.	June.	July.	Aug.
1913.						1913.					
1	114.0	20.00	0.82	1.65	0.04	16	418.0	8.00	0.14	0.01	.....
2	40.0	17.80	.56	1.43	.01	17	338.0	7.50	.14	.01	.....
3	28.0	14.00	.43	1.32	.....	18	338.0	6.90	.11	.01	.....
4	14.2	10.40	.37	1.32	.....	19	258.0	6.40	.11	.01	.....
5	30.0	7.60	.37	1.22	.....	20	a242.0	5.90	.08	0	.....
6	58.0	6.90	.30	1.11	.....	21	a 44.0	5.60	.08	0	.....
7	102.0	6.60	.30	1.11	.....	22	44.0	5.40	.07	8.40	.....
8	53.0	6.20	.30	.65	.....	23	53.0	5.30	5.80	8.40	.....
9	64.0	6.00	.24	.30	.....	24	49.0	5.10	5.60	6.90	.....
10	76.0	5.70	.24	.11	.....	25	40.0	5.00	5.20	5.80	.....
11	418.0	5.30	.24	.03	.....	26	36.0	4.90	4.30	4.30	.....
12	418.0	4.10	.21	.01	.....	27	36.0	4.40	3.30	2.80	.....
13	418	4.10	.21	.01	.....	28	34.0	3.80	2.40	2.00	.....
14	418.0	5.30	.18	.01	.....	29	30.0	2.20	1.87	1.11	.....
15	418.0	8.80	.18	.01	.....	30	25.0	1.76	1.65	.65	.....
						31	.....	1.11	.....	.30	.....

Day.	Mar.	Apr.	May.	June.	Oct.	Day.	Mar.	Apr.	May.	June.	Oct.
1914.						1914.					
1	.....	41.0	5.20	0	0	16	50.0	114.0	0.90	0	8.00
2	.....	78.0	4.36	0	0	17	40.0	118.0	.64	0	8.00
3	.....	40.0	3.80	0	0	18	24.0	110.0	.56	0	5.00
4	.....	30.0	3.40	0.02	14.70	19	22.0	98.0	.40	0	2.90
5	.....	35.0	2.70	.02	16.10	20	16.0	76.0	.26	0	1.50
6	.....	52.0	2.30	0	16.10	21	8.7	58.0	.26	0	1.30
7	.....	33.0	2.00	0	16.70	22	5.5	43.0	0	0	.80
8	.....	64.0	2.00	0	16.10	23	4.5	31.0	0	0	.26
9	.....	129.0	1.80	0	15.50	24	4.5	23.0	0	0	0
10	.....	140.0	1.70	0	14.70	25	3.8	13.9	0	0	0
11	.....	50.0	1.50	0	13.40	26	3.8	11.5	0	0	0
12	.....	54.0	1.40	0	13.40	27	3.8	11.5	0	0	0
13	40.0	50.0	1.20	0	11.10	28	3.2	10.4	0	0	0
14	58.0	45.0	1.10	0	11.10	29	3.0	9.4	0	0	0
15	58.0	106.0	1.00	0	9.00	30	3.0	6.8	0	0	0
						31	31.0	.....	0	.....	0

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1915.								
1	.....	270.00	1.50	.....	.....	0.70	1.74	0.58
2	.....	270.00	1.32	1.74	.....	.62	1.50	.54
3	.....	215.00	1.20	10.00	.....	.47	1.82	.54
4	.....	270.00	1.02	4.04	.....	.32	1.66	.50
5	.....	422.00	.96	4.04	.....	.29	1.50	.50
6	.....	367.00	.86	2.74	.....	.18	1.44	.47
7	.....	103.00	.78	2.30	.....	.12	1.38	.47
8	.....	60.00	.74	1.90	.....	.10	1.32	.47
9	.....	50.00	.66	1.20	.....	.06	1.26	.47
10	.....	40.00	.62	.70	.....	a .02	1.26	3.40
11	.....	37.00	.54	.50	.....	.02	1.20	2.85
12	.....	25.00	.50	.38	.....	.....	1.14	2.52
13	.....	22.00	.50	.23	2.74	.....	1.14	2.30
14	.....	20.00	.47	.14	3.07	.....	1.14	2.06
15	.....	15.50	.54	.10	81.00	.....	1.08	1.98
16	.....	13.50	3.72	.08	21.00	.....	1.08	1.90
17	.....	11.50	3.40	.04	62.00	.....	1.08	1.82
18	.....	9.50	1.82	.04	19.70	.....	1.02	1.82
19	.....	11.50	.92	.26	11.20	.....	1.08	1.74
20	.....	11.50	.52	.20	7.80	62.00	1.02	1.90
21	.....	6.20	.23	.16	5.80	33.00	.90	1.90
22	a 2.8	5.60	.10	.14	4.50	90.00	.82	1.74
23	2.8	4.80	.06	.12	3.40	55.00	.74	1.44
24	168.0	3.40	.06	.08	3.20	21.00	.74	1.20
25	215.0	3.00	.02	.06	2.50	10.00	.70	1.20
26	270.0	2.70	.02	.06	3.20	6.00	.66	1.20
27	270.0	2.40	.....	.04	2.50	3.40	.62	1.14
28	191.0	2.10	.....	.02	1.20	2.80	.58	1.14
29	160.0	1.98	.....	.....	.96	2.60	.62	1.14
30	82.0	1.74	.....	.....	.86	2.30	.58	1.14
31	177.0	.....	.....	.....	.82	1.90	.....	1.08

a Estimated.

Daily discharge, in second-feet, of Middle Creek at Hammond's ranch, Sask., 1911–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1916.								
1	.....	a 98.0	3.80	95.0	4.0	7.50	0	0
2	.....	a 40.0	3.80	83.0	3.6	5.60	0	0
3	.....	a 40.0	3.70	39.0	4.8	4.30	0	0.30
4	.....	35.0	3.50	28.0	a 6.0	3.20	0.70	.38
5	.....	35.0	3.20	21.0	7.2	2.70	1.60	.24
6	.....	34.0	3.10	17.5	92.0	2.10	1.02	.38
7	.....	33.0	2.80	13.6	56.0	1.70	.30	.18
8	.....	21.0	2.70	12.6	36.0	1.50	0	.06
9	.....	18.2	2.40	11.3	23.0	4.50	4.00	.24
10	.....	17.9	2.10	23.0	18.1	4.00	2.20	1.20
11	.....	17.7	1.98	21.0	14.2	2.90	1.50	3.30
12	.....	19.1	1.84	17.2	10.6	3.10	1.10	2.60
13	.....	24.0	1.70	14.6	7.2	14.20	1.02	2.20
14	.....	41.0	1.70	98.0	5.3	15.10	.86	2.00
15	.....	41.0	1.58	55.0	2.7	10.60	.70	1.80
16	.....	29.0	1.58	36.0	2.1	4.30	.54	1.80
17	210	24.0	1.58	28.0	18.1	3.30	.38	1.70
18	133	17.5	1.46	20.0	18.1	2.70	.30	1.70
19	91	18.4	1.46	18.5	13.7	1.90	.24	1.60
20	91	17.5	1.34	17.1	7.2	1.60	.12	1.50
21	165	15.2	1.22	13.3	44.0	1.02	0	1.40
22	a 330	12.6	1.10	10.6	23.0	.70	0	1.40
23	210	10.8	.98	8.8	20.0	.54	0	1.40
24	a 160	9.5	.98	7.2	16.1	.38	0	1.40
25	b 112	7.8	8.40	5.6	11.5	.24	0	1.40
26	152	7.1	26.00	4.8	8.8	.12	0	1.40
27	a 218	6.0	15.60	4.0	7.0	0	.12	1.50
28	a 218	5.1	14.60	3.6	13.3	0	.06	1.50
29	a 158	4.5	48.00	3.3	10.2	0	.06	1.40
30	a 158	3.8	110.00	4.3	24.0	0	0	1.30
31	a 98	.....	68.00	.....	10.6	0	.....	1.40

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1917.					1917.				
1	5	66.0	7.80	6.00	16	798	90.0	.65	.32
2	10	121.0	7.20	6.00	17	641	82.0	.65	.24
3	10	126.0	6.00	6.00	18	623	77.0	.55	.16
4	15	128.0	5.50	6.00	19	622	72.0	.45	.16
5	30	134.0	5.00	6.00	20	622	66.0	.36	.08
6	15	104.0	4.50	6.00	21	680	61.0	.24	.....
7	36	102.0	3.40	6.00	22	800	48.0	1.41	.....
8	275	218.0	2.40	5.00	23	787	36.0	.80	.....
9	a 441	297.0	1.92	3.40	24	679	26.0	.75	.....
10	a 607	324.0	1.41	1.92	25	618	23.0	.90	.....
11	774	291.0	.90	.80	26	522	18.0	.90	.....
12	779	235.0	.80	.60	27	449	15.0	.85	.....
13	760	159.0	.80	.50	28	319	9.0	.80	.....
14	728	141.0	.75	.45	29	161	9.0	.92	.....
15	793	118.0	.70	.40	30	109	9.0	3.40	.....
					31	.....	7.8	.....	.....

a Estimated.
b Gage moved 850 feet north, to point 150 feet above artificial control.

NOTE.—1911: No flow Mar. 14–24, June 10–19, and July 25 to Sept. 3.
1912: Ice present Apr. 1–4. No flow after July 9.
1913: No flow after Aug. 2.
1914: No flow May 22 to June 4, June 6 to Oct. 3 and Oct. 24–31. Record only roughly approximate, owing to inaccurate gage-height observations.
1915: Shifting control May 16 to Oct. 31.
1916: Shifting control Apr. 12–17 and Oct. 29–31. No flow Aug. 27 to Sept. 3, Sept. 21–26, and Sept. 30 to Oct. 3.
1917: Shifting control Apr. 8–16 and May 9–13. No flow July 21–31.

Monthly discharge of Middle Creek at Hammond's ranch, Sask., 1911–1917.

[Drainage area, 308 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1911.						
March 14–31	16.0	0.0	4.2	0.014	0.009	150
April	34.0	.8	7.5	.025	.028	446
May	20.0	.0	3.9	.013	.015	240
June	11.0	.0	2.1	.007	.008	125
July	33.0	.0	6.1	.020	.023	375
September	452.0	.0	44.0	.146	.163	2,618
October	2.2	1.0	1.5	.005	.006	92
November 1–20	1.0	1.0	1.0	.003	.002	40
The period					.254	4,086
1912.						
April 5–30	884.00	26.50	279.91	.930	.910	14,434
May	26.50	3.66	12.70	.042	.048	781
June	15.65	.07	2.80	.009	.010	167
July	.05	.00	.008			0.5
The period					.968	15,382.5
1913.						
April	418.00	14.20	155.00	.515	.580	9,223
May	20.00	1.11	6.71	.022	.020	412
June	5.80	.11	1.19	.004	.004	71
July	8.40	.01	1.64	.005	.006	101
August	.04	.00	.002	.000	.000	0
The period					.610	9,807
1914.						
March 13–31	58.00	3.00	20.00	.0633	.050	759
April	140.00	6.80	56.00	.1770	.200	3,332
May	5.20	.00	1.24	.0039	.004	76
June	.02	.00	.00	.0000	.000	0
October	16.70	.00	6.30	.0200	.020	388
The period					.274	4,555
1915.						
March 22–31	270.00	0.00	[a] 50.00	.159	.18	3,050
April	422.00	1.74	76.00	.241	.27	4,522
May	372.00	.00	.74	.002	.00	46
June	10.00	.00	1.04	.003	.00	62
July	81.00	.00	7.00	.024	.03	474
August	90.00	.00	9.40	.030	.03	578
September	1.82	.58	1.05	.003	.00	62
October	3.40	.47	1.39	.004	.01	85
The period					.52	8,903
1916.						
March 17–31	330.0	91.00	167.00	.530	.30	4,968
April	98.0	3.80	23.00	.073	.08	1,369
May	110.0	0.98	11.00	.035	.04	676
June	98.0	3.30	24.00	.076	.08	1,428
July	92.0	2.10	17.40	.055	.06	1,070
August	15.1	0	3.20	.010	.01	197
September	4.0	0	.56	.002	.00	33
October	3.3	0	1.25	.004	.00	77
The period					.57	9,818
1917.						
April	800.0	5.00	457.00	1.480	1.65	27,193
May	324.0	7.80	104.00	.338	.39	6,395
June	7.8	.24	2.10	.007	.01	125
July	6.0	0	1.81	.006	.01	111
The period					2.06	33,824

[a] Reduced to monthly average.

NOTE.—Records published in 1915 and 1916 have been revised. Area used in computing above table is the same as published in the Canadian hydrometric reports, which was changed from time to time as more definite information of the drainage basin was obtained.

Mean monthly discharge, in second-feet, of Middle Creek at Hammond's ranch, Sask., 1911–1917.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total in acre-feet.
1911	[a] 4.2	7.5	3.90	2.10	6.10	0	44.00	1.50	[b] 1.00	4,106
1912	.....	[c] 250.0	12.70	2.80	.01	0	0	0	(a)	15,824
1913	.....	155.0	6.70	1.19	1.64	0	0	.....	.....	9,807
1914	[d] 12.2	56.0	1.24	0	0	0	0	6.30	.....	4,546
1915	50.0	76.0	.74	1.04	7.70	9.4	1.05	1.39	.....	8,903
1916	[a] 167.0	23.0	11.00	24.00	17.40	3.2	.56	1.25	.....	9,818
1917	[c] 1.0	457.0	104.00	2.10	1.81	0	0	0	.....	33,885
Average	21	146	20	4.7	5.0	1.80	6.5	1.49	1.00	12,413
Average run-off, acre-feet	1,291	8,688	1,230	280	307	111	387	92	60	12,446
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	40

[a] Incomplete record not included in average.
[b] Average for part of month assumed as monthly average.
[c] Estimated.
[d] Reduced to monthly average.

NOTE.—Records published in 1915 and 1916 have been revised.

BATTLE CREEK AT TENMILE POLICE DETACHMENT, SASK.

LOCATION.—In NE. ¼ sec. 33, T. 5, R. 29 W. third meridian, at the traffic bridge, about a quarter of a mile south of Tenmile Police Detachment and 300 yards north of Battle Creek post office.

DRAINAGE AREA.—210 square miles.

RECORDS AVAILABLE.—Open-water flow June 3, 1909, to October 31, 1917.

GAGE.—Chain gage fastened to the guardrail on downstream side of bridge; read by Hugh Thomas.

DISCHARGE MEASUREMENTS.—Made from bridge by wading at point about 600 feet downstream.

CHANNEL AND CONTROL.—Bed composed of a soft sandy clay. Banks high; right bank subject to overflow during extremely high stages, when a part of the water overflows above the gage into the Lodge Creek drainage; left bank not subject to overflow. During summer growth of weeds in bed affects control. One channel at ordinary stages. At high stages, owing to two piers supporting the truss, there are three channels.

EXTREMES OF DISCHARGE.—1909–1917: Maximum stage recorded, 11.76 feet, May 9, 1917; discharge, 1,366 second-feet; minimum stage recorded, 2.18 feet (discharge, 0.8 second-foot), August 4, 1914.

ICE.—Station not maintained during winter season.

DIVERSIONS.—There are several authorized irrigation projects diverting water for irrigation above this station.

ACCURACY.—Stage-discharge relation permanent except during period of spring break up, when it is affected by ice, and during low stages, when it is affected by weeds. Gage read to hundredths twice daily. Daily discharge obtained by applying mean daily gage height to rating table. Records fair.

Discharge measurements of Battle Creek at Tenmile Police Detachment, Sask., 1908–1917.

Date.	Made by—	Gage height.	Discharge.
1908.		*Feet.*	*Sec.-ft.*
Nov. 4	F. T. Fletcher	.....	25.8
1909.			
May 28	H. R. Carscallen	.....	87
June 16	do	2.725	33.6
July 1	do	3.485	83.7
21	do	2.69	21.9
Aug. 9	do	2.72	12.4
Sept. 9	do	2.35	5.1
29	do	2.44	9.6
Nov. 4	do	2.54	13.6
1910.			
Apr. 22	H. R. Carscallen	2.96	31.75
May 16	do	3.03	37.43
June 10	do	2.49	5.80
July 2	do	2.17	[a] 1.28
25	do	2.14	[a] 1.21
Aug. 13	do	2.29	[a] 2.20
Sept. 5	do	2.52	7.56
28	R. G. Swan	2.59	10.12
1911.			
Apr. 21	M. H. French	4.650	146.50
May 18	do	3.390	[b] 55.81
June 10	do	3.020	[c] 27.08
July 5	do	3.480	32.02
13	do	3.215	16.07
19	do	3.060	8.43
Aug. 1	do	3.130	7.73
10	do	3.645	[b] 29.71
24	do	3.000	[b] 7.94
Sept. 2	do	2.890	7.02
7	do	6.690	311.22
15	do	3.610	[b] 52.39
25	do	3.430	[b] 44.89
Oct. 26	do	3.270	42.19
26	do	3.400	48.56
1912.			
Apr. 10	M. H. French	8.12	600
11	do	8.90	706
26	do	3.76	96.9
June 1	G. R. Elliott	3.46	75.7
July 1	O. H. Hoover	2.81	21.9
4	G. R. Elliott	2.85	21.7
18	O. H. Hoover	2.78	18.9
31	G. R. Elliott	2.67	11.8
Sept. 7	do	2.95	18.0
Oct. 4	do	2.80	17.4
Nov. 5	do	2.89	16.5
5	do	2.99	25.3
5	do	3.08	30.3
13	do	2.97	28.4
21	do	2.70	18.2
21	do	2.72	18.4
27	do	2.77	15.6
1913.			
Apr. 18	H. D. St. A. Smith	4.55	154.00
June 2	do	3.00	33.20
13	H. O. Brown	.....	27.50
23	H. D. St. A. Smith	2.80	20.60
July 17	do	2.71	15.20
23	do	2.93	24.80
Aug. 14	do	2.65	13.50
Sept. 13	do	2.50	4.05
Oct. 7	do	2.72	12.60
28	do	2.55	7.73
1914.			
Mar. 19	H. R. Carscallen	4.40	33.00
21	do	3.37	22.00
31	do	2.88	18.40
Apr. 4	do	3.12	38.00
6	do	4.49	129.00
7	do	4.30	105.00
11	do	3.53	66.00
13	do	5.96	258.00
14	do	7.18	391.00
15	do	6.50	332.00
Apr. 23	H. R. Carscallen	3.47	65.00
24	do	3.50	69.00
27	H. W. Rowley	3.28	56.00
May 4	do	2.97	34.00
28	do	2.74	22.00
June 5	do	2.79	22.00
22	do	2.65	14.30
July 9	do	2.31	2.90
Aug. 1	do	2.23	1.71
9	do	2.20	1.11
11	do	2.23	1.49
Sept. 2	do	2.33	3.00
14	do	3.20	36.00
15	do	2.90	23.00
Oct. 3	do	2.54	9.00
6	do	2.78	19.10
23	do	2.78	22.00
Nov. 3	do	2.65	14.70
1915.			
Mar. 15	H. R. Carscallen	2.85	13.7
17	do	3.00	18.3
22	do	4.78	74.0
23	do	5.64	205.0
24	do	4.79	120.0
25	do	4.00	56.0
27	do	3.64	46.0
30	do	3.04	35.0
Apr. 1	do	3.06	36.0
2	do	3.44	58.0
3	do	6.40	312.0
4	do	8.47	588.0
9	do	3.94	98.0
13	H. W. Rowley	3.37	61.0
22	do	3.04	38.0
27	do	2.97	33.0
May 8	do	2.82	25.0
25	do	3.19	44.0
June 3	do	4.54	140.0
4	do	5.74	237.0
21	do	3.33	51.0
July 10	do	3.13	35.0
30	do	3.22	36.0
Aug. 16	do	2.67	14.6
Sept. 7	do	3.10	26.0
Oct. 4	do	3.36	41.0
27	do	3.08	30.0
1916.			
Mar. 23	P. A. Fetterley	4.57	[b] 139
27	do	4.42	[b] 132
31	do	3.68	[b] 74
Apr. 4	do	3.41	[b] 53
7	do	3.50	[b] 63
11	do	3.83	[b] 85
14	do	3.73	[b] 77
25	do	3.21	[b] 50
May 11	H. W. Rowley	3.30	[b] 50
28	do	6.16	298
29	do	6.94	388
30	do	9.19	707
31	do	11.14	967
June 23	do	4.78	[b] 158
26	do	4.06	[b] 104
July 18	do	3.42	[b] 52
Aug. 9	do	3.56	[b] 53
29	do	3.41	[b] 40
Sept. 23	do	3.36	[b] 35
Oct. 10	do	3.69	[b] 58
Nov. 12	do	[d] 3.30	[b] 23
1917.			
Apr. 7	H. W. Rowley	5.15	37.0
24	do	5.78	233.0
May 8	do	10.20	868.0
9	do	11.76	1,366.0
June 11	do	3.87	88.0
July 23	do	3.00	18.2
Aug. 17	do	3.00	16.2
Nov. 26	do	2.77	9.5

[a] Discharge measured by weir.
[b] Discharge measured at miscellaneous section below the gage.
[c] Discharge measured at miscellaneous section above the gage.
[d] Ice present.

Daily discharge, in second-feet, of Battle Creek at Tenmile Police Detachment, Sask., 1909–1917.

Day.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	June.	July.	Aug.	Sept.	Oct.	Nov.
1909.							1909.						
1	a 45.0	85.1	22.1	8	8	11.8	16	53.6	35	8	8	11.8	.....
2	a 40.0	85.1	22.1	6.5	8	11.8	17	53.6	35	8	8	11.8	.....
3	38.6	75.2	22.1	6.5	8	11.8	18	102	28.3	8	8	11.8	.....
4	38.6	49.6	22.1	6.5	8	11.8	19	102	28.3	8	8	11.8	.....
5	32	49.6	22.1	6.5	11.8	11.8	20	353	22.05	8	8	11.8	.....
6	32	42.1	22.1	8	11.8	11.8	21	860	22.05	8	8	11.8	.....
7	32	42.1	22.1	8	11.8	11.8	22	412	16.45	8	8	11.8	.....
8	38.6	42.1	22.1	8	11.8	11.8	23	251	16.45	8	8	11.8	.....
9	45.8	35	22.1	8	11.8	11.8	24	198	16.45	8	8	11.8	.....
10	53.6	35	16.5	8	11.8	11.8	25	168	16.45	8	8	11.8	.....
11	53.6	38.5	16.5	8	11.8	11.8	26	143	16.45	5.2	8	11.8	.....
12	53.6	42.1	16.5	8	11.8	11.8	27	131	16.45	5.2	8	11.8	.....
13	45.8	42.1	11.8	8	11.8	11.8	28	131	22.05	5.2	8	11.8	.....
14	45.8	42.1	11.8	8	11.8	.....	29	131	35	5.2	8	11.8	.....
15	53.6	351	8	8	11.8	.....	30	96	35	5.2	8	11.8	.....
							31	.....	35	5.2	.....	11.8	.....

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1910.								
1	67.5	20.5	7.0	2.0	1.50	5.50	9.10	8.75
2	67.5	15.0	7.0	1.5	1.50	6.10	8.75	9.10
3	67.5	15.0	7.0	1.5	1.60	6.40	8.40	9.10
4	59.0	15.0	7.0	1.5	1.80	7.00	8.40	11.40
5	59.0	15.0	7.0	1.5	2.00	7.70	8.40	12.75
6	50.5	15.0	7.0	4.0	2.10	9.45	8.40	14.10
7	50.5	15.0	7.0	4.0	2.10	11.40	8.40	15.00
8	50.5	27.5	7.0	4.0	2.10	13.65	8.40	15.00
9	50.5	27.5	7.0	4.0	2.20	12.75	8.05	14.55
10	50.5	27.5	7.0	4.0	2.30	11.85	8.05	14.10
11	50.5	27.5	7.0	4.0	2.30	10.95	7.70	14.10
12	50.5	27.5	7.0	4.0	2.40	10.15	7.70	14.10
13	50.5	27.5	6.5	4.0	2.40	9.45	7.70	13.65
14	50.5	27.5	6.5	3.2	2.65	8.75	7.35	13.20
15	42.5	35.0	4.0	1.1	2.95	7.70	7.35	12.75
16	35.0	35.0	6.5	1.1	3.25	7.70	7.35	12.30
17	35.0	27.5	10.5	1.0	3.85	7.70	7.35	11.85
18	35.0	27.5	10.5	1.0	4.60	7.35	7.70	10.95
19	35.0	27.5	8.7	1.0	3.55	7.35	8.05	10.50
20	35.0	27.5	7.0	1.0	3.40	7.00	8.40	10.15
21	35.0	27.5	7.0	1.0	2.80	7.00	8.75	9.80
22	27.5	20.5	7.0	1.0	3.10	7.00	9.10	9.10
23	27.5	20.5	7.0	1.0	3.55	7.35	9.10	8.40
24	27.5	20.5	7.0	1.0	3.85	8.05	9.10	8.05
25	27.5	20.5	5.5	1.2	4.00	8.75	9.10	7.70
26	27.5	15.0	4.0	1.2	4.60	9.45	9.10	7.70
27	27.5	15.0	4.0	1.2	5.20	10.15	8.75	7.70
28	27.5	10.5	4.0	1.3	5.20	10.50	8.75	.....
29	20.5	10.5	3.2	1.4	5.20	10.15	8.75	.....
30	20.5	18.7	2.5	1.4	5.20	9.45	8.75	.....
31	.....	7.0	.....	1.5	5.20	.....	8.75	.....

a Estimated.

Daily discharge, in second-feet, of Battle Creek, at Tenmile Police Detachment, Sask., 1909–1917—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1911.								
1	.....	56.0	32.0	57.0	9.0	7.0	36.0	32.0
2	.....	60.0	29.0	51.0	8.5	6.0	36.0	33.0
3	.....	64.0	23.0	48.0	9.0	6.0	38.0	34.0
4	.....	70.0	22.0	39.0	10.0	25.0	56.0	31.0
5	.....	76.0	24.0	32.0	11.0	245.0	49.0	35.0
6	.....	74.0	26.0	33.0	43.0	415.0	45.0	31.0
7	.....	61.0	23.0	25.0	25.0	321.0	39.5	36.0
8	.....	53.0	28.0	23.0	32.0	255.0	38.0	.....
9	.....	43.0	25.0	25.0	34.0	181.0	37.0	.....
10	.....	41.0	27.0	23.0	29.0	133.0	36.0	.....
11	.....	42.0	23.0	22.0	23.0	87.0	34.0	.....
12	.....	41.0	20.0	20.0	20.0	73.0	33.0	.....
13	.....	38.0	18.0	16.0	17.5	67.0	31.0	.....
14	.....	34.0	18.0	14.0	17.5	58.0	30.0	.....
15	.....	37.0	15.0	13.0	14.0	52.0	29.0	.....
16	.....	48.0	11.0	8.5	11.0	46.0	28.0	.....
17	.....	67.0	7.5	8.0	11.0	45.0	24.0	.....
18	.....	56.0	8.0	9.0	10.0	44.0	32.0	.....
19	.....	45.0	8.0	9.5	8.0	42.0	34.0	.....
20	.....	48.0	8.0	8.4	7.0	38.0	33.0	.....
21	146	45.0	8.0	11.0	6.0	32.0	33.0	.....
22	122	39.0	9.5	12.5	6.4	54.0	33.0	.....
23	98	49.0	11.0	11.5	8.0	43.0	44.0	.....
24	87	55.0	12.0	15.0	8.5	43.0	41.0	.....
25	77	49.0	26.0	13.0	7.5	45.0	37.0	.....
26	76	53.0	93.0	11.0	7.5	45.0	34.0	.....
27	80	56.0	69.0	8.0	9.0	45.0	36.0	.....
28	64	54.0	39.0	7.5	8.0	42.0	42.0	.....
29	54	47.0	37.0	5.0	8.5	39.0	57.0	.....
30	45	41.0	39.0	5.5	7.5	38.0	34.0	.....
31	.....	36.0	.....	9.0	8.0	.....	31.0	.....
1912.								
1	340	96	69	18.8	a 15.2	15.2	a 19.5	54
2	430	93	58	18.2	a 21	16.4	18.2	15.8
3	771	96	46	18.2	26	17.0	18.2	15.8
4	746	92	42	21	25	18.2	18.8	13.6
5	647	96	40	22	22	19.5	a 19.5	a 25
6	372	112	38	19.5	a 18.2	23	19.5	23
7	285	166	98	26	16.4	22	21	16.4
8	388	126	89	28	15.2	21	23	a 17.0
9	472	112	80	a 28	13.6	23	28	18.2
10	502	103	62	a 101	a 12.5	a 18.2	28	a 18.8
11	551	96	54	98	11.1	a 12.5	26	19.5
12	421	86	30	23	11.1	11.1	a 26	a 20
13	238	78	28	19.5	a 12.5	15.2	25	21
14	276	74	54	20	12.5	16.4	a 26	21
15	160	73	54	26	16.4	18.2	a 26	42
16	156	64	74	23	17.6	a 18.8	26	.....
17	148	58	48	21	18.2	19.5	a 28	.....
18	137	57	38	18.2	18.8	21	27	.....
19	142	58	80	18.2	a 21	18.2	26	.....
20	126	66	38	18.2	25	19.5	a 26	.....
21	136	58	28	17.6	23	28	25	.....
22	107	62	22	17.6	17.6	25	23	.....
23	103	67	16.4	17.0	16.4	24	22	.....
24	104	67	13.0	16.4	a 15.2	23	a 21	.....
25	107	62	11.5	a 15.2	a 13.6	23	21	.....
26	97	62	11.1	13.6	12.5	a 22	21	.....
27	96	98	12.0	18.2	13.6	a 21	21	.....
28	79	154	26	13.6	26	19.5	21	.....
29	74	106	a 18.8	a 11.1	23	21	28	.....
30	78	92	a 18.8	8.8	21	18.8	32	.....
31	.....	83	.....	a 11.1	18.2	.....	42	.....

a Interpolated.

Daily discharge, in second-feet, of Battle Creek at Tenmile Police Detachment, Sask., 1909–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1913.								
1	.....	180	56	36.0	26.0	2.8	3.2	7.6
2	.....	183	62	33.0	26.0	5.4	2.8	7.6
3	.....	183	60	31.0	29.0	4.5	2.8	6.6
4	.....	180	56	19.9	32.0	3.2	2.8	6.6
5	.....	262	50	16.2	40.0	5.4	2.8	a 8.6
6	.....	517	50	a 14.2	32.0	4.1	2.4	a 10.0
7	.....	360	52	12.2	a 19.3	4.5	2.4	11.8
8	.....	214	54	16.7	14.7	6.6	2.4	12.2
9	.....	131	55	16.2	12.2	7.2	3.2	11.3
10	.....	169	56	16.2	17.2	a 7.6	3.7	12.2
11	.....	212	96	a 16.7	17.7	8.1	3.2	10.4
12	.....	311	101	17.2	18.2	7.6	2.8	a 11.3
13	.....	591	87	a 16.7	23.0	8.1	3.7	12.2
14	.....	736	82	16.2	22.0	7.6	3.7	14.7
15	.....	400	80	14.7	24.0	10.0	a 4.1	14.7
16	.....	291	76	7.6	17.7	12.2	a 4.5	14.2
17	.....	204	75	5.0	13.7	18.8	5.0	13.7
18	.....	154	62	4.5	10.0	26.0	2.0	13.7
19	.....	150	59	a 10.9	a 9.5	25.0	2.8	13.2
20	.....	153	58	18.2	9.0	19.8	1.2	12.2
21	.....	140	56	21.0	17.6	16.7	a 3.2	11.8
22	.....	a 116	55	a 20.0	29.9	13.2	5.4	11.8
23	.....	96	55	19.0	23.0	10.0	24.0	13.2
24	.....	77	52	a 29.0	10.0	7.2	22.0	11.8
25	.....	67	51	a 36.0	16.2	a 6.3	17.7	11.3
26	.....	61	51	39.0	a 11.8	a 5.9	13.2	a 10.4
27	.....	62	a 47	45.0	7.6	a 5.0	8.6	10.0
28	.....	62	a 43	80.0	5.4	4.5	8.6	10.4
29	.....	a 60	40	88.0	a 4.5	3.7	8.6	11.3
30	.....	58	39	28.0	3.7	3.7	8.6	12.2
31	.....	.....	38	.....	2.4	3.2	8.1	13.2
1914.								
1	.....	18.6	30.4	15.0	10.70	1.32	3.0	6.3
2	.....	18.6	32.0	17.0	9.10	1.64	3.1	6.3
3	.....	25.0	31.0	17.6	7.50	1.32	3.1	6.3
4	.....	37.0	32.0	23.0	6.30	.80	3.1	22.0
5	.....	56.0	42.0	19.1	3.70	1.16	3.1	25.0
6	.....	55.0	36.0	23.0	3.10	1.00	3.1	20.0
7	.....	116.0	33.0	25.0	3.10	1.00	3.0	19.6
8	.....	101.0	37.0	25.0	2.30	1.48	3.0	34.0
9	.....	84.0	69.0	20.0	2.30	1.80	3.1	62.0
10	.....	71.0	71.0	18.1	2.30	1.80	3.1	54.0
11	.....	86.0	69.0	16.5	2.30	1.48	3.0	46.0
12	.....	130.0	53.0	18.1	1.30	1.64	3.7	37.0
13	.....	337.0	45.0	31.0	1.50	1.48	11.6	31.0
14	.....	432.0	42.0	42.0	1.30	1.48	45.0	26.0
15	.....	399.0	36.0	40.0	1.30	1.32	29.0	40.0
16	47	323.0	37.0	27.0	1.30	1.64	22.0	49.0
17	39	186.0	32.0	24.0	1.60	1.32	17.6	46.0
18	27	112.0	30.0	18.1	2.00	1.80	15.0	34.0
19	28	97.0	30.0	15.5	2.40	1.64	13.4	29.0
20	24	93.0	30.0	13.4	2.40	1.80	12.9	26.0
21	23	80.0	27.0	12.0	1.80	1.32	12.5	23.0
22	21	62.0	25.0	12.0	1.32	1.32	10.3	22.0
23	20	64.0	25.0	10.7	1.64	1.64	9.1	20.0
24	20	66.0	26.0	9.1	1.32	3.00	8.8	18.1
25	21	58.0	25.0	15.5	1.32	1.96	8.1	18.1
26	22	58.0	23.0	16.5	1.64	1.64	6.9	18.1
27	20	51.0	20.0	18.6	1.16	3.30	6.0	16.0
28	20	46.0	17.6	15.5	1.16	3.30	6.0	13.4
29	20	42.0	16.5	12.5	1.32	3.30	6.0	15.5
30	19	33.0	16.0	10.7	1.16	3.10	6.0	15.5
31	19	.....	15.0	.....	1.16	3.10	.....	15.0

a Interpolated.

Daily discharge, in second-feet, of Battle Creek at Tenmile Police Detachment, Sask., 1909–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1915.								
1	.....	38	28.0	31	30	34	16	25
2	.....	80	28.0	58	41	33	18	25
3	.....	407	28.0	120	35	32	24	35
4	.....	587	28.0	191	30	29	27	41
5	.....	555	26.0	270	27	28	29	41
6	.....	344	25.0	262	26	28	24	43
7	.....	145	25.0	169	24	26	26	41
8	.....	107	26.0	123	31	26	26	43
9	.....	90	20.0	98	38	24	28	42
10	.....	73	18.2	86	35	24	28	44
11	.....	65	17.0	79	33	22	30	44
12	.....	61	15.0	73	28	22	29	44
13	.....	54	15.4	66	25	22	36	43
14	.....	56	26.0	63	120	22	39	43
15	.....	56	50.0	57	96	25	40	43
16	29	50	125.0	51	66	16	40	42
17	19	46	95.0	54	63	23	40	42
18	19	44	75.0	57	71	46	37	44
19	12	41	63.0	52	66	46	37	44
20	13	36	55.0	54	57	46	35	43
21	24	38	49.0	52	51	42	34	44
22	164	36	45.0	45	46	37	33	43
23	200	35	41.0	40	40	27	32	41
24	110	38	39.0	51	48	24	31	40
25	54	36	38.0	49	45	24	31	40
26	62	35	43.0	47	42	22	30	40
27	54	34	41.0	52	40	18	28	36
28	48	33	38.0	44	37	20	23	30
29	48	32	36.0	42	34	18	22	28
30	45	31	34.0	31	36	18	25	27
31	40	.....	33.0	.....	36	17	.....	26
1916.								
1	.....	70	48	406	108	57	40	45
2	.....	71	60	280	87	46	43	47
3	.....	98	56	216	102	44	41	48
4	.....	83	52	178	155	60	49	52
5	.....	91	57	156	122	56	56	60
6	.....	84	53	492	98	53	55	55
7	.....	94	42	250	84	43	51	61
8	.....	80	51	221	81	42	46	57
9	.....	69	53	156	91	53	41	50
10	545	76	53	144	94	49	46	57
11	975	91	57	247	68	89	42	54
12	975	90	53	664	62	73	40	63
13	825	79	50	355	66	64	40	63
14	415	75	51	239	56	60	43	60
15	298	78	54	189	60	54	46	60
16	304	68	51	164	56	51	42	58
17	318	63	50	144	52	48	39	54
18	247	60	48	125	60	53	36	54
19	198	57	47	106	88	69	38	50
20	128	56	54	206	62	56	41	48
21	208	59	47	101	56	50	38	50
22	144	54	50	103	52	48	41	54
23	120	47	54	158	49	44	37	56
24	84	45	76	136	47	42	37	48
25	114	43	112	171	50	45	39	48
26	69	47	141	104	73	48	41	47
27	105	51	242	101	87	46	41	48
28	101	51	330	98	106	42	46	50
29	98	54	397	98	77	38	46	47
30	64	53	558	103	61	37	42	48
31	79	.....	980	.....	56	40	.....	50

Daily discharge, in second-feet, of Battle Creek at Tenmile Police Detachment, Sask.; 1909–1917—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1917.							
1	.....	142	99	42.0	12.3	27.0	26.0
2	.....	165	100	44.0	15.8	33.0	26.0
3	.....	264	102	38.0	17.2	33.0	23.0
4	.....	278	101	52.0	21.0	28.0	23.0
5	.....	244	97	47.0	21.0	29.0	23.0
6	.....	422	92	42.0	23.0	29.0	24.0
7	37	739	89	38.0	21.0	26.0	24.0
8	59	928	93	37.0	23.0	27.0	24.0
9	81	1,212	84	37.0	36.0	35.0	24.0
10	156	1,203	78	40.0	33.0	44.0	29.0
11	377	1,075	90	27.0	28.0	39.0	31.0
12	624	777	110	24.0	24.0	33.0	30.0
13	658	552	93	21.0	21.0	28.0	28.0
14	572	474	81	19.3	17.9	26.0	28.0
15	449	422	77	17.9	16.5	22.0	28.0
16	264	360	70	24.0	17.9	28.0	30.0
17	183	269	66	27.0	15.1	28.0	36.0
18	188	222	65	26.0	15.1	28.0	29.0
19	204	198	64	26.0	13.0	30.0	38.0
20	366	180	58	25.0	9.5	29.0	38.0
21	458	172	53	19.3	9.5	24.0	41.0
22	509	156	54	17.9	10.2	21.0	33.0
23	509	147	52	17.9	6.7	17.9	42.0
24	257	136	42	17.9	10.2	30.0	38.0
25	215	128	47	12.3	10.2	45.0	41.0
26	229	123	51	12.3	10.2	46.0	51.0
27	227	163	49	14.4	10.9	38.0	44.0
28	175	123	46	15.8	10.9	33.0	38.0
29	153	113	46	9.5	10.9	28.0	32.0
30	146	106	45	10.2	16.5	26.0	36.0
31	.....	97	.....	11.6	23.0	.....	37.0

NOTE.—1909: June 20–25, discharge determin ed by using rating curve for 1912, which is fairly well defined.
1911: Control shifting throughout the summer, owing to growth of grass in the channel. Considerable daily flow at this point during the last part of March and the first part of April.
1912: Ice present Apr. 1–3; discharge estimated.
1914: Stage-discharge relation affected by ice Mar. 16–31; discharge estimated.
1915: Shifting control Mar. 16–30 and June 22 to Oct. 31.
1916: Shifting control July 18 to Oct. 31.
1917: Stage-discharge relation affected by ice Apr. 7–15. Shifting control June 12 to Oct. 31, owing to growth of weeds.

Monthly discharge of Battle Creek at Tenmile Police Detachment, Sask., 1909–1917.

[Drainage area, 210 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1909.						
June	860	32	128.0	0.582	0.650	7,617
July	85	16	36.7	.167	.192	2,257
August	22	5	12.6	.057	.066	775
September	8	6	7.8	.035	.039	464
October	12	8	11.3	.051	.059	695
November 1–13	12	12	12.0	.054	.026	304
The period	.....	.....	.....	.....	1.032	12,112
1911.						
April 21–30	146	45	84.9	.422	.157	1,684
May	76	34	50.9	.253	.292	3,130
June	93	8	24.6	.122	.136	1,464
July	57	5	19.1	.095	.110	1,174
August	43	6	14.0	.070	.080	861
September	415	6	85.7	.426	.475	5,100
October	56	24	36.8	.183	.211	2,263
November 1–7	36	31	33.1	.165	.041	460
The period	.....	.....	.....	.....	1.502	16,136

Monthly discharge of Battle Creek at Tenmile Police Detachment, Sask., 1909–1917—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1912.						
April 3–30	771	74	269	1.34	1.39	14,939
May	166	57	87.5	.435	.50	5,380
June	98	11.1	43.2	.214	.24	2,571
July	101	8.8	44.1	.120	.14	1,482
August	26	11.1	17.7	.088	.10	1,088
September	28	11.1	19.6	.097	.11	1,166
October	42	18.2	24.2	.120	.14	1,488
November 1–15	54	13.6	22.7	.113	.06	675
The period					2.68	28,789
1913.						
April	736.0	58.0	213.00	1.060	1.18	12,674
May	101.0	38.0	59.80	.298	.34	3,677
June	88.0	4.5	24.80	.123	.14	1,476
July	40.0	2.4	17.30	.086	.10	1,064
August	26.0	2.8	8.83	.044	.05	543
September	24.0	1.2	6.08	.030	.03	362
October	14.7	6.6	11.40	.057	.06	701
The period					1.90	20,497
1914.						
March 16–31	47.00	19.00	24.00	.116	.070	773
April	432.00	18.60	111.00	.530	.591	6,605
May	71.00	15.00	34.00	.162	.187	2,091
June	42.00	9.10	19.40	.092	.103	1,154
July	10.70	1.16	2.67	.013	.015	164
August	3.30	0.80	1.80	.009	.010	111
September	45.00	3.00	9.45	.045	.050	562
October	62.00	6.30	26.30	.125	.144	1,617
The period					1.170	13.077
1915.						
March 16–31	200	12	59	.281	.17	1,866
April	587	31	109	.519	.58	6,486
May	125	15	40	.190	.22	2,460
June	270	31	82	.391	.44	4,891
July	120	24	45	.214	.25	2,767
August	46	16	27	.129	.15	1,660
September	40	16	30	.143	.16	1,785
October	44	25	39	.186	.21	3,398
The period					2.18	24,313
1916.						
March 10–31	975	64	292	1.390	1.14	12,739
April	98	43	68	.324	.36	4,046
May	980	42	130	.619	.71	7,993
June	664	98	204	.971	1.08	12,139
July	155	47	76	.362	.42	4,673
August	89	37	52	.248	.29	3,197
September	56	36	43	.205	.23	2,559
October	63	45	53	.252	.29	3,259
The period					4.52	50,605
1917.						
April 7–30	658	37.0	296.0	1.410	1.26	14,090
May	1,212	97.0	374.0	1.780	2.05	22,996
June	110	42.0	73.0	.348	.39	4,341
July	52	9.5	26.0	.124	.14	1,599
August	36	6.7	17.1	.081	.09	1,051
September	46	17.9	30.0	.143	.16	1,785
October	51	23.0	32.0	.152	.18	1,968
The period					4.27	47,833

NOTE.—Monthly discharge for 1910 not computed. Area used in computing these tables is the same as published in the Canadian hydrometric reports, which was changed from time to time as more definite information of the drainage, basin was obtained.

Mean monthly discharge, in second-feet, of Battle Creek at Tenmile Police Detachment, Sask., 1909–1917.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total in acre-feet.
1909	.....	.....	.....	a128.0	37.0	12.6	7.8	11.3	b12.0	b12,112
1911	.....	b85	51.0	25.0	19.1	14.0	86.0	37.0	b33.0	16,136
1912	.....	276	88.0	43.0	24.0	17.7	19.6	24.0	b22.7	30,273
1913	.....	213	60.0	25.0	17.3	8.8	6.1	11.4	.....	20,497
1914	b24	111	34.0	19.4	2.7	1.8	9.4	26.0	.....	13,077
1915	b59	109	40.0	82.0	45.0	27.0	30.0	39.0	.....	24,313
1916	b292	68	130.0	204.0	76.0	52.0	43.0	53.0	.....	50,605
1917	.....	b296	374.0	73.0	26.0	17.1	30.0	32.0	.....	47,833
Average	.....	155	111	75	31	18.9	29	29	.....	28,962
Average run-off, acre-feet	.....	9,223	6,825	4,463	1,906	1,162	1,726	1,783	.....	27,088
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	131

a Estimated. b Incomplete record not included in average.

BATTLE CREEK AT WILKES'S RANCH, SASK.

LOCATION.—In NW. ¼ sec. 33, T. 5, R. 27 W. third meridian, at R. W. Wilkes's ranch, 12 miles east of the Tenmile Royal Northwest Mounted Police Detachment.

DRAINAGE AREA.—310 square miles.

RECORD AVAILABLE.—Open-water flow, May 29, 1912, to October 31, 1917, at present station; July 5, 1910, to May 28, 1912, at W. S. Wilson's ranch, 6 miles upstream.

GAGE.—Vertical staff fastened to post driven into bed of stream; read by Mrs. Bertha Wilkes. A Stevens water-stage recorder was installed June 28, 1917, from which records were obtained during part of the season.

DISCHARGE MEASUREMENTS.—Made by wading or from temporary cable.

CHANNEL AND CONTROL.—Bed of stream clean and likely to shift. Banks high, not subject to overflow. One channel at all stages.

EXTREMES OF DISCHARGE.—1910–1917: Maximum stage recorded, 8.20 feet May 9 and 10, 1917 (discharge, 1,061 second-feet); minimum stage recorded "dry" (no flow) July 23 to August 2, 1914.

ICE.—Observations discontinued during winter season.

DIVERSIONS.—There are a number of authorized irrigation projects above this station on the main stream and its tributaries.

ACCURACY.—Stage-discharge relation affected by ice and shifting control during break up, otherwise fairly permanent. Gage read twice daily at beginning of season and once daily during remainder of season. Automatic gage records used July 17 to August 7, August 18 to 22, and from September 13 to October 19, 1917. Daily discharge obtained by applying mean daily gage height to rating table. Records fair.

Discharge measurements of Battle Creek at Wilkes's ranch, Sask., 1910–1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1910.		*Feet.*	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
July 6	H. R. Carscallen	1.07	3.44	July 10	H. W. Rowley	1.34	1.71
22	do	1.04	2.68	Aug. 8	do	1.29	.43
Aug. 10	do	1.03	2.95	Sept. 1	do	1.36	2.10
Sept. 2	do	1.06	2.99	Oct. 1	do	1.49	6.80
27	R. G. Swan	1.22	7.05	Nov. 2	do	1.78	19.60
Oct. 20	do	1.09	4.07	1915.			
1911.				Apr. 6	H. R. Carscallen	4.70	368.0
Apr. 17	M. H. French	3.855	[a] 75.79	7	do	4.06	248.0
May 10	do	1.850	43.70	22	H. W. Rowley	2.29	43.0
June 3	do	1.420	18.39	May 7	do	1.83	15.8
July 12	do	1.450	14.41	June 5	do	3.98	277.0
Aug. 4	do	1.370	11.43	25	do	2.24	55.0
26	do	1.330	11.40	Aug. 5	do	2.01	32.0
Sept. 23	do	1.890	45.09	Sept. 4	do	1.93	31.0
Oct. 26	do	1.910	44.19	23	do	1.95	28.0
1912.				Oct. 20	do	1.85	30.0
Apr. 29	M. H. French	2.88	93.42	1916.			
May 29	G. R. Elliott	3.26	158.20	Apr. 3	P. A. Fetterley	4.42	101
June 24	O. H. Hoover	2.00	[b] 16.40	6	do	3.48	43
July 5	G. R. Elliott	2.06	30.54	13	do	3.10	103
5	do	2.06	31.13	28	H. W. Rowley	2.48	[c] 57
Aug. 12	do	1.74	8.65	May 12	do	2.43	[c] 59
Sept. 12	do	1.87	17.12	June 1	do	5.65	[c] 566
Oct. 18	do	2.02	24.92	2	do	4.54	[c] 356
Nov. 6	do	2.29	[a] 8.73	27	do	2.80	[c] 108
22	do	2.49	[a] 29.30	July 20	do	2.58	[c] 89
1913.				Aug. 12	do	2.50	[c] 81
Apr 25	H. D. St. A. Smith	2.76	85.6	31	do	2.09	[c] 40
May 16	do	2.55	70.4	Sept. 27	Newhall	2.05	[c] 38
June 18	do	1.50	6.5	Nov. 13	H. W. Rowley	[a] 2.34	[c] 22
July 15	do	1.75	19.7	1917.			
Aug. 12	do	1.60	10.1	Apr. 21	H. W. Rowley	7.44	[a] 613.00
Sept. 16	do	1.39	3.8	27	do	4.25	323.00
Oct. 8	do	1.64	13.5	May 4	do	4.22	344.00
31	do	1.74	7.1	June 23	do	2.00	53.00
1914.				July 17	do	1.48	17.60
May 2	H. W. Rowley	2.25	42.00	21	do	1.30	10.80
26	do	1.66	5.80	Aug. 18	do	1.30	11.60
June 20	do	1.44	4.40	22	do	1.28	11.00

[a] Ice present.
[b] Discharge measured at miscellaneous section above gage.
[c] Discharge measured at miscellaneous section below gage.

Daily discharge, in second-feet, of Battle Creek at Wilkes's ranch, Sask., 1910–1917.

Day.	July.	Aug.	Sept.	Oct.	Day.	July.	Aug.	Sept.	Oct.
1910.					1910.				
1	.....	2.30	4.10	8.32	16	3.10	2.62	8.96	6.50
2	.....	2.30	4.54	8.64	17	2.94	2.46	8.32	2.94
3	.....	2.30	4.76	8.32	18	2.30	2.46	7.40	4.32
4	.....	2.30	5.72	8.00	19	2.94	2.30	6.80	4.10
5	3.70	2.62	8.00	8.00	20	3.10	2.30	6.50	4.10
6	3.50	5.46	9.60	8.32	21	3.10	2.46	6.24	5.20
7	3.70	2.94	10.96	9.60	22	3.10	2.62	5.98	11.30
8	3.70	2.94	12.06	9.60	23	3.50	2.78	6.24	11.30
9	3.70	2.94	12.82	9.60	24	3.50	2.62	6.24	11.30
10	3.70	2.62	13.20	9.60	25	3.30	2.62	5.46	10.28
11	3.70	2.62	11.30	9.60	26	3.10	2.62	5.46	9.94
12	3.70	2.62	9.60	9.60	27	2.94	2.62	6.80	11.30
13	3.50	2.94	10.28	8.96	28	2.62	2.78	7.10	13.20
14	3.50	2.62	10.62	8.64	29	2.46	2.78	7.70	15.20
15	3.30	2.62	9.60	8.32	30	2.30	2.94	8.00	13.20
					31	2.30	3.90	.....	12.44

Daily discharge, in second-feet, of Battle Creek at Wilkes's ranch, Sask., 1910–1917—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1911.								
1	.....	57	28.0	54.0	10.0	9.4	42	53
2	.....	69	25.0	52.0	9.5	9.0	40	47
3	.....	74	17.0	52.0	10.0	8.7	39	39
4	.....	75	13.0	41.0	10.5	53.0	53	35
5	.....	94	29.0	37.0	11.0	241.0	54	32
6	.....	94	28.0	30.0	11.0	490.0	49	42
7	.....	85	25.0	24.0	28.0	440.0	39	53
8	.....	61	31.0	22.0	38.0	388.0	43	.....
9	.....	59	29.0	19.0	35.0	241.0	42	.....
10	.....	41	26.0	17.0	38.0	182.0	42	.....
11	.....	39	25.0	16.0	28.0	112.0	40	.....
12	.....	40	18.0	14.0	23.0	85.0	39	.....
13	.....	40	15.0	12.0	19.0	86.0	38	.....
14	.....	31	7.0	10.0	18.0	77.0	38	.....
15	.....	27	5.0	8.6	16.0	70.0	37	.....
16	.....	27	4.0	8.6	15.0	53.0	37	.....
17	76.0	44	3.5	8.6	13.0	46.0	35	.....
18	178.0	55	3.5	8.6	12.0	47.0	36	.....
19	208.0	42	3.3	8.6	12.0	50.0	38	.....
20	146.0	41	3.3	8.6	11.0	53.0	38	.....
21	140.0	51	3.0	8.6	9.0	50.0	40	.....
22	158.0	48	3.2	8.6	8.5	48.0	39	.....
23	126.0	44	3.3	11.0	8.0	47.0	46	.....
24	106.0	46	12.0	14.0	8.5	49.0	50	.....
25	77.0	45	42.0	15.0	9.5	40.0	48	.....
26	84.0	46	103.0	17.0	12.0	40.0	46	.....
27	73.0	47	69.0	13.0	11.6	40.0	45	.....
28	77.0	48	43.0	11.0	10.7	40.0	59	.....
29	61.0	45	31.0	8.8	10.0	43.0	53	.....
20	57.0	44	32.0	8.8	9.7	42.0	49	.....
31	.....	35	.....	9.0	9.7	.....	52	.....
1912.								
1	.....	288	89	8.9	5.4	21	22	35
2	.....	288	81	8.9	5.4	17.3	20	30
3	.....	279	72	9.3	6.7	15.6	14.5	26
4	.....	285	61	13.4	9.8	15.6	13.4	26
5	.....	285	56	27	15.0	17.9	18.5	26
6	.....	282	48	17.3	16.7	21	18.5	18.0
7	.....	282	41	23.0	15.0	23.4	16.7	11.0
8	.....	323	37	15.6	14.5	29	17.9	10.0
9	.....	343	34	12.3	12.8	16.2	19.1	25
10	.....	340	34	11.8	12.3	16.2	22	25
11	.....	324	32	10.8	11.3	16.2	24	27
12	.....	305	29	14.5	9.8	16.2	25	27
13	.....	285	28	12.3	8.9	15.6	24	15.0
14	.....	256	30	12.8	12.8	15.6	24	18.0
15	.....	247	30	16.2	30	15.6	25	20
16	.....	249	35	17.3	34	16.7	26	.....
17	.....	230	37	15.0	16.7	16.7	27	.....
18	.....	221	42	15.0	15.0	17.3	26	.....
19	.....	216	40	15.6	15.0	17.3	32	.....
20	.....	216	26	15.6	15.0	17.3	32	.....
21	.....	223	29	15.6	16.7	17.3	36	.....
22	.....	227	23	15.0	15.0	17.9	40	.....
23	.....	234	20	15.6	15.0	23	40	.....
24	.....	234	20	15.0	13.9	23	40	.....
25	.....	227	14.9	15.0	13.9	23	40	.....
26	.....	227	12.3	15.6	13.4	21	30	.....
27	.....	237	11.8	16.7	12.3	21	30	.....
28	.....	189	8.9	15.6	11.3	21	30	.....
29	.....	162	8.9	12.8	15.0	22	35	.....
30	.....	114	7.5	11.3	15.6	22	37	.....
31	.....	90	.....	9.8	15.6	.....	42	.....

Daily discharge, in second-feet, of Battle Creek at Wilkes's ranch, Sask., 1910–1917—Continued.

Day.	Apr.	May.	June.	July.	Aug	Sept.	Oct.
1913.							
1	[a] 299	66	33.0	33.0	11.5	6.8	10.3
2	[a] 295	69	29.0	33.0	11.5	6.8	10.3
3	[a] 275	71	24.0	26.0	11.5	6.1	11.5
4	[a] 289	67	23.0	[b] 28.0	9.1	6.1	11.5
5	307	60	24.0	[b] 30.0	8.3	6.1	9.9
6	314	53	17.9	33.0	8.3	5.6	8.7
7	372	48	14.6	[b] 29.0	8.3	5.6	7.5
8	406	56	13.5	26.0	8.3	5.6	11.1
9	313	58	13.5	23.0	7.2	5.4	12.5
10	272	53	14.0	21.0	7.2	5.4	14.6
11	268	60	13.0	16.8	7.2	5.4	12.0
12	295	69	12.5	11.0	8.3	5.0	9.9
13	357	74	14.6	22.0	8.3	4.7	8.3
14	444	78	15.1	21.0	9.1	4.6	7.5
15	402	78	15.1	18.4	12.5	4.6	6.8
16	398	72	14.6	21.0	16.8	4.6	7.2
17	188	69	14.0	20.0	32.0	3.8	6.4
18	143	66	12.0	16.8	32.0	4.7	8.3
19	138	64	12.0	15.1	32.0	4.7	9.9
20	145	60	12.0	12.5	28.0	5.4	10.3
21	136	59	20.0	11.5	24.0	5.4	9.9
22	126	58	14.0	22.0	23.0	6.4	11.1
23	108	56	26.0	17.9	15.6	6.4	11.1
24	97	53	26.0	24.0	7.5	7.9	14.0
25	86	51	26.0	22.0	7.5	7.9	13.0
26	78	51	31.0	17.9	7.5	9.5	12.0
27	74	49	28.0	16.8	7.5	11.1	11.0
28	69	48	32.0	14.6	6.8	12.0	10.0
29	73	45	35.0	13.0	6.8	12.0	9.0
30	70	43	44.0	14.6	6.1	10.3	8.0
31	.....	40	.....	14.6	6.8	.....	7.0
1914.							
1	.....	[a] 42.0	4.9	2.30	0	2.3	8.9
2	.....	42.0	4.3	2.30	0	2.3	10.4
3	.....	42.0	2.5	1.76	0.06	2.0	11.6
4	.....	42.0	2.3	1.76	.06	2.0	14.8
5	.....	43.0	6.2	1.76	.06	2.0	17.2
6	.....	44.0	9.3	1.76	.06	2.0	18.4
7	.....	44.0	13.2	1.76	.06	2.0	19.2
8	.....	44.0	14.0	1.28	.06	2.0	19.2
9	.....	47.0	10.8	.80	.06	2.0	20.0
10	.....	54.0	6.5	.80	.24	2.0	22.0
11	.....	64.0	4.6	.80	.24	2.0	24.0
12	.....	65.0	4.6	.60	.24	16.4	26.0
13	.....	49.0	3.9	.60	.40	16.4	28.0
14	.....	38.0	5.5	.24	.40	22.0	31.0
15	.....	35.0	5.9	.18	.40	22.0	31.0
16	.....	31.0	6.2	.06	.40	22.0	32.0
17	.....	30.0	7.5	.06	.80	22.0	32.0
18	.....	25.0	6.8	.06	1.28	22.0	26.0
19	.....	21.0	4.6	.06	2.00	22.0	26.0
20	.....	17.2	3.6	.06	2.00	20.0	24.0
21	.....	15.6	3.6	0	2.50	20.0	24.0
22	.....	14.4	3.6	0	2.50	20.0	22.0
23	.....	12.0	4.3	0	2.50	18.4	20.0
24	.....	13.2	4.3	0	2.50	18.4	14.4
25	.....	13.2	4.3	0	2.50	17.6	14.4
26	.....	12.4	3.3	0	2.50	17.6	14.4
27	.....	7.5	3.3	0	2.50	17.2	13.2
28	.....	7.2	3.3	0	2.50	17.2	13.2
29	.....	6.5	2.8	0	2.50	15.2	12.0
30	.....	5.9	2.8	0	2.50	7.8	12.0
31	.....	4.9	.....	0	2.30	.....	12.0

[a] Estimated.

[b] Interpolated.

Daily discharge, in second-feet, of Battle Creek at Wilkes's ranch, Sask., 1910–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1915.								
1	.....	419	28.0	18.5	60	48.0	17.2	38
2	.....	461	28.0	34.0	58	48.0	20.0	38
3	.....	549	26.0	39.0	58	41.0	25.0	38
4	.....	585	23.0	169.0	72	39.0	29.0	39
5	.....	469	20.0	278.0	81	36.0	30.0	39
6	.....	369	14.0	318.0	79	35.0	15.2	41
7	.....	248	15.5	350.0	72	32.0	15.2	41
8	.....	417	16.5	339.0	65	27.0	19.0	41
9	.....	215	19.5	326.0	56	27.0	20.0	41
10	.....	107	22.0	286.0	49	27.0	22.0	41
11	.....	96	24.0	231.0	44	28.0	23.0	41
12	.....	91	26.0	185.0	109	29.0	26.0	41
13	.....	73	28.0	104.0	78	33.0	26.0	41
14	.....	67	35.0	115.0	115	34.0	30.0	39
15	.....	64	66.0	78.0	136	38.0	30.0	37
16	.....	64	221.0	78.0	135	41.0	32.0	37
17	.....	54	105.0	76.0	118	41.0	32.0	36
18	.....	59	100.0	76.0	124	42.0	34.0	34
19	.....	57	82.0	78.0	93	50.0	36.0	30
20	.....	49	59.0	80.0	74	57.0	36.0	26
21	.....	44	50.0	72.0	72	60.0	35.0	26
22	.....	41	49.0	65.0	63	55.0	34.0	26
23	.....	42	41.0	60.0	58	45.0	32.0	29
24	.....	40	33.0	62.0	54	39.0	32.0	30
25	.....	37	28.0	62.0	54	31.0	32.0	32
26	.....	36	29.0	58.0	54	22.0	33.0	34
27	.....	33	29.0	57.0	54	20.0	34.0	34
28	.....	31	25.0	55.0	55	17.2	34.0	39
29	.....	28	22.0	55.0	56	17.2	34.0	39
30	.....	28	21.0	54.0	58	17.2	36.0	43
31	.....	.....	21.0	.....	53	17.2	.....	44
1916.								
1	.....	103	52	726	65	59	35	41
2	.....	86	69	257	58	59	39	45
3	.....	101	73	152	72	47	47	45
4	.....	100	79	171	129	47	59	54
5	.....	111	75	238	140	47	51	57
6	.....	43	67	286	116	59	51	59
7	.....	127	67	310	116	47	51	61
8	.....	102	64	351	116	44	47	64
9	.....	55	62	445	111	41	52	64
10	.....	56	61	485	93	70	57	66
11	.....	68	58	590	93	99	57	69
12	.....	63	59	610	93	80	49	67
13	.....	103	61	548	93	75	61	64
14	.....	123	58	368	75	57	44	63
15	.....	120	59	269	65	57	44	63
16	.....	109	57	218	54	57	39	58
17	.....	106	58	194	59	54	37	57
18	.....	96	59	184	64	57	39	58
19	.....	72	60	161	94	62	39	58
20	.....	69	54	129	87	55	35	59
21	.....	63	55	113	76	45	35	59
22	.....	64	58	115	53	45	38	56
23	.....	65	57	140	47	45	41	55
24	.....	60	59	143	43	42	41	53
25	324	54	108	143	39	42	41	55
26	289	46	143	131	49	42	49	55
27	258	42	194	109	89	42	37	55
28	249	57	248	95	111	39	37	55
29	197	27	329	103	128	46	40	57
30	155	47	445	105	101	43	45	45
31	131	.....	656	.....	81	39	.....	55

Daily discharge, in second-feet, of Battle Creek at Wilkes's ranch, Sask., 1910–1917—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1917.							
1	.....	208	113	45.0	7.1	15.4	19.0
2	.....	201	134	45.0	9.4	16.2	21.0
3	.....	305	168	42.0	9.4	18.0	17.6
4	.....	344	192	42.0	9.9	18.0	17.2
5	.....	422	214	43.0	9.7	19.6	17.6
6	.....	539	217	45.0	9.9	21.0	17.2
7	.....	584	225	41.0	10.3	21.0	17.6
8	.....	998	203	36.0	10.5	22.0	18.0
9	.....	1,061	185	32.0	11.0	23.0	19.0
10	.....	1,061	165	23.0	11.8	23.0	17.2
11	.....	944	142	16.7	11.8	25.0	18.5
12	.....	895	134	13.7	11.8	22.0	19.0
13	.....	656	114	13.7	11.0	19.6	18.0
14	.....	539	107	14.4	11.0	18.5	18.5
15	.....	[a] 476	92	17.6	11.0	17.6	18.5
16	.....	[a] 413	81	17.6	11.0	17.2	21.0
17	.....	350	69	17.6	11.0	18.5	19.6
18	.....	305	60	17.2	11.5	19.0	22.0
19	.....	257	58	13.2	12.0	18.0	22.0
20	.....	232	55	12.6	11.8	18.0	30.0
21	613	206	55	11.2	11.8	18.0	32.0
22	177	196	53	10.3	10.8	17.2	34.0
23	446	188	53	10.1	11.8	16.7	34.0
24	340	168	51	9.7	11.8	19.6	40.0
25	246	148	48	9.7	11.2	23.0	40.0
26	316	148	46	9.7	11.2	34.0	40.0
27	323	148	46	10.5	10.8	29.0	43.0
28	250	134	46	9.9	10.3	24.0	43.0
29	231	126	46	10.3	10.3	21.0	46.0
30	212	116	46	9.0	11.8	20.0	46.0
31	.....	116	.....	7.2	13.4	.....	46.0

[a] Estimated.

NOTE.—1911: Ice present, no data available, Mar. 25 to Apr. 16. Stage-discharge relation affected by ice in bottom of channel Apr. 17–22; discharge estimated. Control shifting because of grass in bottom of channel May 10 to Aug. 20.

1912: Stage-discharge relation affected by ice Nov. 1–15; determinations of discharge only roughly approximate.

1913: Stage-discharge relation affected by ice Oct. 25–31; discharge estimated.

1914: Gage taken out by ice Apr. 15; replaced May 2. No flow July 21 to Aug. 2.

1916: Shifting control Mar. 25 to May 25.

1917: Ice jams Apr. 12–20; discharge could not be computed or estimated. Control shifting, owing to break-up, Apr. 21 to May 3.

Monthly discharge of Battle Creek at Wilkes's ranch, Sask., 1910–1917.

[Drainage area, 310 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1910.						
July 5–31	3.7	2.3	3.20	0.012	0.013	171
August	5.5	2.3	2.74	.010	.012	169
September	13.2	4.1	8.01	.030	.033	477
October	15.2	2.9	9.02	.034	.039	555
The period	.....	.....	.....	.....	.....	1,372
1911.						
April 17–30	208	57.0	111.9	.430	.224	3,107
May	94	27.0	51.4	.198	.228	3,160
June	103	3.0	22.7	.087	.097	1,351
July	54	8.6	18.6	.072	.083	1,144
August	38	8.0	15.3	.059	.068	941
September	499	8.7	106.0	.408	.455	6,307
October	59	35.0	43.4	.167	.192	2,669
November 1–7	53	33.0	43.0	.165	.043	597
The period	.....	.....	.....	.....	1.390	19,276

Monthly discharge of Battle Creek at Wilkes's ranch, Sask., 1910–1917—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1912.						
May	343	90	249	0.837	0.96	15,289
June	89	7.5	34.6	.117	.13	2,060
July	27	8.9	14.5	.049	.06	894
August	34	5.4	14.2	.048	.06	872
September	29	15.6	19.0	.064	.07	1,128
October	42	13.4	27.3	.092	.11	1,681
November 1–15	35	10	[a] 22.6	.076	.04	[a] 672
The period					1.43	22,596
1913.						
April	444	69	228	.768	.86	13,567
May	78	40	59.5	.200	.23	3,658
June	44	12	20.8	.070	.08	1,238
July	33	11.0	20.8	.070	.08	1,279
August	32	6.8	12.8	.043	.05	787
September	12.0	3.8	6.5	.022	.02	388
October	34	6.4	10.0	.034	.04	615
The period					1.36	21,532
1914.						
April			[b] 127.00	.4090	.4560	[b] 7,535
May 2–31	65.00	4.90	29.70	.0958	.1060	1,767
June	14.00	2.30	5.43	.0175	.0200	323
July	2.30	.00	.61	.0020	.0020	38
August	2.50	.00	1.16	.0037	.0040	71
September	22.00	2.00	12.60	.0406	.0450	750
October	32.00	8.90	19.80	.0640	.0740	1,218
The period					.7070	11,702
1915.						
March			[b] 35	.318	.18	[b] 2,159
April	585	28.0	162	.523	.58	9,640
May	221	14.0	42	.136	.16	2,582
June	350	18.5	129	.416	.46	7,676
July	136	44.0	74	.240	.28	4,550
August	60	17.2	35	.113	.13	2,152
September	36	15.2	28	.090	.10	1,666
October	44	26.0	37	.119	.14	2,275
The period					2.03	32,700
1916.						
March 25–31	324	39	229	.739	.19	3,179
April	127	39	79	.255	.28	4,701
May	656	35	116	.374	.43	7,133
June	726	41	263	.848	.95	15,650
July	140	39	84	.271	.31	5,165
August	99	39	53	.171	.20	3,259
September	61	35	45	.145	.16	2,678
October	69	41	57	.184	.21	3,505
The period					2.73	45,270
1917.						
April 21–30	613.0	177.0	315.0	1.020	.38	6,247
May	1,061.0	116.0	403.0	1.300	1.50	24,780
June	225.0	46.0	107.0	.345	.38	6,367
July	45.0	7.2	21.0	.068	.08	1,291
August	13.4	7.1	10.9	.035	.04	670
September	34.0	15.4	20.0	.065	.07	1,190
October	46.0	17.2	27.0	.087	.10	1,660
The period					2.55	42,205

[a] Ice present, Nov. 1 to 15; determination of discharge roughly approximate.
[b] Flow estimated from that at other stations on this stream.

NOTE—Area used in computing these tables is the same as published in the Canadian hydrometric reports, which was changed from time to time as more definite information of the drainage basin was obtained.

Mean monthly discharge, in second-feet, of Battle Creek at Wilkes's ranch, Sask., 1910–1917.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total in acre-feet.
1910	.....	.....	.....	.....	[a] 3.20	2.70	8.0	9.0	.....	[a] 1,366
1911	.....	[a] 112	51	23.0	18.60	15.30	106.0	43.0	[a] 43	19,276
1912	.....	.....	249	35.0	14.50	14.20	19.0	27.0	[a] 23	22,613
1913	.....	[b] 228	60	21.0	21.00	12.80	6.5	10.0	.....	21,532
1914	.....	[b] 127	30	5.4	.61	1.16	12.6	19.8	.....	11,702
1915	[b] 35	162	42	129.0	74.00	35.00	28.0	37.0	.....	32,700
1916	[a] 229	79	116	263.0	84.00	53.00	45.0	57.0	.....	45,270
1917	.....	[a] 315	403	107.0	21.00	10.90	20.0	27.0	.....	42,205
Average	[b] 35	149	136	83	33	18.1	31	29	.....	27,900
Average run-off, acre-feet	2,159	8,866	8,362	4,939	2,029	1,113	1,845	1,783	.....	31,096
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	102

[a] Incomplete record not included in average. [b] Discharge estimated.

NOTE.—Records July 5, 1910 to May 28, 1912, obtained at Wilson's ranch 6 miles upstream.

BATTLE CREEK AT STIRLING'S RANCH, SASK.

LOCATION.—In sec. 22, T. 3, R. 27 W. third meridian.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—August 12 to November 20, 1909.

GAGE.—Erected for temporary use. Made of 2 by 6 inch lumber, marked into feet and tenths by scratches in the surface of the wood, and driven into the bed of the stream close to the left bank.

DISCHARGE MEASUREMENTS.—Made by wading. High-water measurements unobtainable.

CHANNEL AND CONTROL.—Bed composed of sand. Banks composed of hard clay; high and not subject to overflow. Channel straight for 150 feet above and 200 feet below station.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 1.0 foot August 12–13 and November 16–20 (discharge, 12.9 second-feet); minimum stage recorded, 0.7 foot November 2 (discharge, 6.7 second-feet), the low stage on this date being due to use of water in J. A. Gaff's ditch.

ICE.—Observations discontinued November 20.

DIVERSIONS.—A number of irrigation systems divert water from this stream and its tributaries above this station.

ACCURACY.—Record poor.

Discharge measurements of Battle Creek at Stirling's ranch, Sask., 1909.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Aug. 12	F. H. Peters	1.00	12.89
Sept. 22	P. M. Sauder	.77	8.05

Daily discharge, in second-feet, of Battle Creek at Stirling's ranch, Sask., 1909.

Day.	Aug.	Sept.	Oct.	Nov.	Day.	Aug.	Sept.	Oct.	Nov.
1909.					1909.				
1	.....	8.7	8.7	10.7	16	10.7	8.7	10.7	12.9
2	.....	8.7	8.7	[a] 6.7	17	10.7	8.7	10.7	12.9
3	.....	6.7	8.7	6.7	18	10.7	8.7	10 7	12.9
4	.....	6.7	8.7	8.7	19	10.7	8.7	10.7	12.9
5	.....	6.7	8.7	8.7	20	8.7	8.1	10.7	12.9
6	.....	6.7	8.7	8.7	21	8.7	8.7	10.7	.....
7	.....	6.7	8.7	10.7	22	8.7	8.7	10.7	.....
8	.....	6.7	8.7	10.7	23	8.7	8.7	10.7	.....
9	.....	6.7	8 7	10.7	24	8.7	8.7	10.7	.....
10	.....	6.7	8 7	10.7	25	8.7	8.7	10.7	.....
11	.....	6.7	8.7	10.7	26	8.7	8.7	10.7	.....
12	12.9	7.7	8.7	10.7	27	8.7	8.7	10.7	.....
13	12.9	7.7	8.7	10.7	28	8.7	8.7	10.7	.....
14	10.7	8.1	8.7	10.7	29	8.7	8.7	10.7	.....
15	10.7	8.1	10.7	10.7	30	8.7	8.7	10.7	.....
					31	8.7	.....	10.7	.....

[a] J. A. Gaff using water in his ditch.

BATTLE CREEK AT NASH'S RANCH, SASK.

LOCATION.—In NE. ¼ sec. 3, T. 3, R. 27 W. third meridian, at E. R. Nash's ranch, Nashlyn, Sask.

DRAINAGE AREA.—500 square miles.

RECORDS AVAILABLE.—Open-water flow May 11, 1910, to October 31, 1917.

GAGE.—Vertical staff; read by E. R. Nash.

DISCHARGE MEASUREMENTS.—Made from highway bridge one-half mile below gage by wading 200 feet below gage, or with weir.

CHANNEL AND CONTROL.—Bed composed of clay; fairly permanent. Banks high; not subject to overflow. Control consists of gravel and stones; likely to shift.

EXTREMES OF DISCHARGE.—1910–1917: Maximum stage recorded, 9.30 feet, April 9, 1912 (discharge, 3,026 second-feet); no flow July 16 to August 12, 1910, and July 12 to September 20, 1914. (See hydrograph, Pl. XXIII.)

ICE.—Observations discontinued during winter season. Stage-discharge relation affected by ice during spring break-up and at times during the late autumn.

DIVERSIONS.—A number of irrigation projects divert water from this stream and its tributaries.

ACCURACY.—Stage-discharge relation fairly permanent, but affected by ice during periods of spring break-up. Gage read once daily to hundredths during open-water period. Records good except for period of break-up, for which they are fair.

Discharge measurements of Battle Creek at Nash's ranch, Sask., 1910–1917.

Date.	Made by—	Gage height.	Discharge.
1910.		*Feet.*	*Sec.-ft.*
May 11	N. M. Sutherland	1.05	18.4
17	F. H. Peters	1.03	16.4
June 4	do	.68	2.43
July 9	N. M. Sutherland	.50	75
15	F. H. Peters	.35	0
27	N. M. Sutherland		0
Sept. 27	R. G. Swan	.76	4.60
Oct. 21	do	.74	1.85
1911.			
Apr. 18	M. H. French	1.910	[a] 90.22
May 12	do	1.250	37.41
June 5	do	.730	[b] 10.61
July 10	do	.720	10.10
Aug. 6	do	.710	9.12
28	do	.470	[b] 2.21
Sept. 13	do	6.150	[c] 711.00
19	do	1.375	46.93
Oct. 24	do	1.180	33.45
1912.			
Apr. 19	M. H. French	2.82	201
20	do	2.66	185
May 26	G. R. Elliott	1.51	71.8
July 1	do	.48	4.68
Aug. 3	do	.50	4.31
Sept. 5	do	.72	15.1
Oct. 16	do	.86	23.2
Nov. 7	do	.92	[d] 23.8
23	do	.85	[d] 15.6
1913.			
Apr. 24	H. D. St. A. Smith	2.10	108.00
May 15	do	1.53	74.00
June 17	do	.38	1.55
July 14	do	.65	15.60
Aug. 9	do	.51	5.80
Sept. 17	do	.36	1.27
Oct. 9	do	.58	7.20
Nov. 1	do	.87	15.70
1914.			
Mar. 23	H. D. St. A. Smith	2.35	30.00
24	do	2.40	27.00
28	do	2.56	23.00
Apr. 1	do	4.08	108.00
2	do	3.50	72.00
6	do	1.87	59.00
10	do	2.70	183.00
11	do	2.35	88.00
May 1	H. W. Rowley	1.22	52.00
26	do	.43	3.00
June 19	do	.36	1.58
July 11	do	.14	0
Aug. 8	do	Dry.	0
31	do	Dry.	0
Sept. 30	do	.51	4.90
Oct. 31	do	.61	9.80
1915.			
Mar. 18	H. W. Rowley	[a] 2.66	[d] 10.1
26	do	[a] 5.51	[d] 189.0
30	do	[a] 4.90	[d] 124.0
Apr. 2	do	5.76	714.0
3	do	6.30	798.0
6	do	5.94	746.0
10	do	2.36	152.0
23	do	1.12	45.0
May 21	do	1.46	67.0
June 23	do	1.21	52.0
July 18	do	1.76	109.0
Aug. 14	do	.71	14.8
Sept. 4	do	.80	23.0
24	do	.88	27.0
Oct. 21	do	.85	26.0
1916.			
Mar. 31	H. W. Rowley	5.77	[a] 691
Apr. 3	do	3.46	[a] 295
10	do	1.99	[a] 131
14	do	1.83	[a] 117
May 1	do	1.31	[a] 67
13	do	1.29	[a] 64
June 3	do	3.95	[a] 383
30	do	1.90	[a] 112
July 21	do	1.87	[a] 113
Aug. 14	do	1.39	[a] 70
Sept. 1	do	1.10	[a] 39
28	do	1.04	[a] 39
Oct. 25	do	1.24	[a] 54
Nov. 14	do	[d] 1.32	[a] 26
1917.			
Apr. 3	G. S. Wenden	[d] 5.03	30.00
10	do	[d] 7.52	562.00
12	do	[d] 13.92	2,468.00
13	do	[d] 13.44	1,814.00
14	do	[d] 11.60	1,814.00
19	do	[e] 5.72	538.00
May 2	do	2.84	235.00
10	do	6.37	845.00
21	do	2.86	241.00
28	do	2.16	158.00
31	do	2.05	149.00
June 6	P. A. Fetterley	1.76	122.00
23	do	1.04	47.00
July 17	H. W. Rowley	.72	18.40
18	do	.59	11.10
24	P. A. Fetterley	.37	3.00
Aug. 6	do	.28	1.35
21	H. W. Rowley	.52	8.20
28	P. A. Fetterley	.52	7.70
Sept. 29	do	.92	31.50
Oct. 3	do	.81	24.00
30	do	[d] 1.12	29.00

[a] Discharge measured at miscellaneous section below gage.
[b] Discharge measured at miscellaneous section above gage.
[c] Slope measurement.
[d] Ice present.
[e] Ice going out.

Daily discharge, in second-feet, of Battle Creek at Nash's ranch, Sask., 1910–1917.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1910.								
1	.....	.....	1.60	1.15	.....	2.6	4.00	10.60
2	.....	.....	2.50	1.15	.....	2.2	4.95	11.80
3	.....	.....	6.30	1.15	.....	2.0	4.45	8.15
4	.....	.....	2.90	2.90	.....	2.2	4.45	6.30
5	.....	.....	2.20	1.15	.....	2.0	4.95	10.00
6	.....	.....	1.90	1.05	.....	2.6	4.20	10.00
7	.....	.....	2.20	.45	.....	2.9	4.95	8.15
8	.....	.....	2.20	.45	.....	3.8	6.00	11.80
9	.....	.....	2.90	1.00	.....	5.7	4.95	12.40
10	.....	.....	3.20	.60	.....	5.7	4.65	18.00
11	.....	18.0	2.90	.45	.....	6.3	6.30	10.60
12	.....	19.8	2.20	.45	.....	6.3	6.30	17.20
13	.....	18.0	2.20	.45	0.00	8.2	6.30	22.20
14	.....	18.0	2.90	.20	1.15	8.2	6.30	30.50
15	.....	10.6	2.90	.00	1.15	8.2	6.30	26.40
16	.....	10.6	3.20	.....	.55	7.4	6.65	.....
17	.....	16.4	2.20	.....	.90	6.7	6.65	.....
18	.....	15.4	2.60	.....	1.00	6.3	7.00	.....
19	.....	30.5	2.90	.....	1.15	6.3	6.30	.....
20	.....	13.9	2.20	.....	1.00	6.3	4.00	.....
21	.....	23.0	2.90	.....	1.05	4.5	3.40	.....
22	.....	13.9	2.90	.....	1.05	4.5	2.05	.....
23	.....	12.4	6.00	.....	1.05	4.0	1.50	.....
24	.....	12.4	5.00	.....	1.60	3.8	1.15	.....
25	.....	13.9	2.20	.....	1.95	3.6	1.15	.....
26	.....	12.4	1.60	.....	1.60	4.0	1.15	.....
27	.....	7.4	1.15	.....	1.60	4.0	1.15	.....
28	.....	6.3	1.15	.....	1.60	3.8	.75	.....
29	.....	4.5	1.15	.....	1.60	3.6	.85	.....
30	.....	3.8	1.15	.....	1.85	3.6	1.05	.....
31	.....	2.5	.....	.....	1.85	.....	8.15	.....
1911.								
1	94	68	33.0	38.0	6.6	1.2	43.0	46.0
2	140	60	26.0	16.0	7.3	3.0	42.0	52.0
3	96	59	18.0	20.0	8.0	5.5	41.0	51.0
4	94	68	15.0	25.0	8.0	9.0	38.0	52.0
5	84	76	13.0	26.0	6.9	34.0	38.0	45.0
6	89	84	8.3	25.0	9.4	566.0	41.0	38.0
7	76	89	7.3	20.0	10.3	558.0	52.0	38.0
8	169	76	11.0	18.0	11.0	434.0	45.0	56.0
9	61	70	13.0	13.0	16.0	320.0	42.0	43.0
10	72	50	11.0	11.0	18.0	225.0	38.0	38.0
11	68	42	14.5	7.3	22.0	160.0	38.0	42.0
12	68	38	13.0	5.5	23.0	130.0	38.0	51.0
13	91	35	13.0	4.2	24.0	107.0	35.0	48.0
14	142	29	9.0	4.2	11.0	89.0	35.0	49.0
15	175	26	7.3	3.8	17.0	76.0	35.0	50.0
16	80	27	4.0	2.4	15.0	68.0	33.0	.....
17	84	26	2.0	2.2	15.0	62.0	29.0	.....
18	84	26	1.2	2.2	11.0	56.0	30.0	.....
19	174	34	1.4	4.0	9.0	49.0	332.0	.....
20	180	42	2.0	2.0	8.3	46.0	5.0	.....
21	140	29	2.7	2.2	7.3	50.0	36.0	.....
22	160	29	3.5	.7	6.6	51.0	38.0	.....
23	120	42	3.0	.7	4.8	60.0	35.0	.....
24	114	32	2.0	.8	3.0	49.0	34.0	.....
25	98	29	1.4	1.4	1.4	51.0	35.0	.....
26	84	38	2.2	4.2	3.8	56.0	35.0	.....
27	70	42	1.4	4.5	3.0	58.0	26.0	.....
28	70	38	2.7	4.8	2.7	60.0	28.0	.....
29	71	38	35.0	6.9	2.2	52.0	45.0	.....
30	75	38	42.0	6.9	1.9	49.0	52.0	.....
31	.....	35	.....	6.9	1.2	.....	44.0	.....

Daily discharge, in second-feet, of Battle Creek at Nash's ranch, Sask., 1910–1917—Cont.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1912.							
1	.....	98	99	4.3	6.6	13.7	22.0
2	.....	95	82	3.0	5.0	16.4	20.0
3	.....	103	77	3.2	4.0	17.6	19.4
4	.....	102	68	3.2	5.0	16.4	18.8
5	.....	97	63	3.4	5.4	15.9	18.8
6	.....	102	57	3.2	4.7	17.0	18.8
7	.....	101	54	2.9	5.4	17.6	17.6
8	.....	110	49	10.6	8.8	17.0	17.6
9	3,026	108	36	11.1	9.7	14.2	22
10	2,270	109	32	9.2	8.8	14.7	21
11	1,745	112	32	16.4	7.9	18.8	20
12	1,310	102	32	14.7	6.6	17.0	22
13	1,025	100	30	6.6	7.0	17.0	24
14	829	88	31	7.0	6.6	16.4	24
15	660	86	32	6.2	5.4	16.4	24
16	387	79	34	3.2	6.6	15.3	24
17	299	79	32	7.0	7.0	14.7	24
18	243	79	32	8.8	22.0	14.7	27
19	216	70	32	11.6	17.0	13.2	25
20	190	70	45	11.1	17.0	14.2	25
21	104	69	32	10.2	17.0	14.7	27
22	154	68	22	12.6	17.0	16.4	27
23	142	75	25	16.4	17.0	17.0	30
24	134	72	21	8.3	17.0	19.4	34
25	133	74	15.9	7.4	16.5	22.0	31
26	130	71	11.6	9.2	13.7	14.7	26
27	128	78	11.6	5.0	12.6	16.4	26
28	120	74	10.6	6.6	12.6	22.0	26
29	113	81	10.6	4.0	12.6	21.0	27
30	108	117	10.6	6.6	12.6	21.0	29
31	.....	106	.....	5.4	12.1	.....	29
1913.							
1	418	75	23.00	31.0	10.50	6.00	14.0
2	408	77	23.00	25.0	10.50	5.60	14.0
3	368	59	22.00	26.0	5.20	6.40	11.5
4	398	62	18.00	31.0	6.00	5.60	12.5
5	298	68	18.00	30.0	2.40	5.60	14.5
6	288	63	12.00	38.0	1.35	4.80	11.5
7	370	61	8.60	37.0	1.70	3.60	10.0
8	352	44	4.00	31.0	5.20	3.20	10.0
9	460	43	.40	30.0	5.60	3.60	8.1
10	1,027	49	.24	24.0	11.00	3.20	10.0
11	652	48	.42	25.0	12.50	2.80	12.5
12	366	46	.29	19.5	9.50	2.00	15.0
13	338	44	.42	17.0	7.60	1.70	10.0
14	515	75	.24	19.0	7.60	1.70	12.5
15	868	69	.24	10.0	9.00	1.70	10.0
16	894	60	.16	5.6	10.00	1.35	11.0
17	376	67	.76	10.0	12.00	1.70	12.0
18	288	64	.64	10.5	10.00	1.35	10.0
19	248	53	.42	19.5	10.50	1.70	10.5
20	165	71	10.00	14.5	16.50	1.70	10.0
21	170	60	31.00	15.0	19.50	1.70	16.0
22	165	62	12.50	22.0	19.00	2.00	10.0
23	139	54	10.00	22.0	15.00	5.60	10.0
24	118	52	15.00	15.0	14.50	6.80	12.5
25	108	50	16.00	15.0	15.00	7.20	11.0
26	88	46	26.00	17.5	9.00	10.00	15.0
27	77	48	37.00	31.0	9.50	10.50	11.0
28	77	46	36.00	19.5	8.60	9.00	20.0
29	61	40	32.00	14.5	6.40	15.00	22.0
30	73	31	30.00	19.5	5.60	14.50	15.5
31	.....	28	.....	12.5	5.60	.....	11.5

Daily discharge, in second-feet, of Battle Creek at Nash's ranch, Sask., 1910–1917—Cont.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1914.								
1	.....	119	56.00	0.94	1.50	.....	0	6.7
2	.....	78	49.00	.94	1.36	.....	0	7.5
3	.....	62	40.00	1.08	1.36	.....	0	4.0
4	.....	65	33.00	1.22	1.36	.....	0	5.2
5	.....	75	33.00	1.08	.80	.....	0	4.3
6	.....	93	36.00	1.22	.20	.....	0	17.6
7	.....	132	33.00	1.22	.20	.....	0	21.0
8	.....	145	41.00	1.36	0	.....	0	17.6
9	.....	137	33.00	1.36	0	.....	0	19.4
10	.....	169	33.00	.80	0	.....	0	29.0
11	.....	169	33.00	.80	.04	.....	0	31.0
12	.....	132	64.00	.80	0	.....	0	38.0
13	.....	147	65.00	1.08	0	.....	0	31.0
14	36	195	48.00	1.36	0	.....	0	24.0
15	76	374	40.00	1.50	0	.....	0	24.0
16	72	407	39.00	1.36	0	.....	0	17.6
17	51	312	32.00	1.50	0	.....	0	17.6
18	48	256	23.00	1.50	0	.....	0	32.0
19	43	184	17.00	1.36	0	.....	0	30.0
20	68	143	14.00	1.22	0	.....	0	23.0
21	51	124	10.70	.80	0	.....	10.7	17.6
22	41	118	8.30	.50	0	.....	7.5	15.8
23	29	102	6.30	.20	0	.....	7.1	14.6
24	27	90	4.60	.38	0	.....	9.5	7.9
25	32	79	4.60	.38	0	.....	8.7	6.7
26	37	80	3.70	.38	0	.....	8.3	5.2
27	32	78	2.50	.38	0	.....	7.5	7.5
28	33	74	.80	.44	0	.....	7.1	9.9
29	30	66	1.22	.50	0	.....	7.1	11.5
30	28	57	1.08	1.50	0	.....	6.7	9.1
31	34	.....	.80	.....	0	.....	.....	9.9
1915.								
1	.....	535	31.0	25	40	47.0	15.0	25
2	.....	976	30.0	31	38	38.0	17.2	24
3	.....	793	28.0	32	33	37.0	23.0	24
4	.....	652	26.0	90	32	35.0	23.0	25
5	.....	768	28.0	123	35	32.0	24.0	25
6	.....	740	26.0	261	32	32.0	25.0	27
7	.....	501	14.5	272	32	28.0	25.0	28
8	.....	285	13.0	228	33	26.0	25.0	31
9	.....	207	8.6	174	35	25.0	25.0	31
10	.....	162	9.0	133	47	24.0	24.0	35
11	.....	131	5.5	103	40	20.0	28.0	32
12	.....	113	5.2	91	39	19.0	24.0	32
13	.....	100	5.2	83	39	19.0	25.0	32
14	.....	91	7.0	93	32	16.6	25.0	32
15	.....	83	22.0	72	32	17.8	25.0	32
16	.....	73	39.0	64	102	17.8	28.0	34
17	.....	73	39.0	63	102	17.8	30.0	32
18	10.1	73	106.0	60	93	17.8	29.0	32
19	40.0	64	98.0	55	93	16.6	30.0	31
20	70.0	62	83.0	60	92	16.6	27.0	29
21	100.0	55	78.0	64	80	39.0	26.0	25
22	140.0	47	69.0	55	69	32.0	25.0	24
23	170.0	45	60.0	54	64	28.0	24.0	24
24	200.0	45	47.0	47	55	27.0	27.0	26
25	230.0	38	37.0	47	47	25.0	25.0	26
26	254.0	37	32.0	39	41	16.0	24.0	25
27	361.0	39	32.0	47	45	20.0	24.0	25
28	204.0	37	31.0	40	47	19.0	24.0	24
29	194.0	36	32.0	47	51	19.0	24.0	27
30	164.0	32	32.0	45	45	17.8	24.0	24
31	336.0	.....	30.0	.....	54	16.6	.....	23

Daily discharge, in second-feet, of Battle Creek at Nash's ranch, Sask., 1910–1917—Cont.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1916.									
1	.....	332	532	60	622	130	65	42	38
2	.....	364	398	60	774	134	60	42	39
3	.....	381	303	56	345	115	56	44	46
4	.....	375	234	62	374	110	48	49	53
5	.....	369	195	65	236	110	46	51	60
6	.....	338	170	65	158	146	46	56	64
7	.....	369	167	57	180	120	46	52	66
8	.....	319	127	60	326	103	46	62	60
9	.....	324	104	53	242	100	65	53	64
10	.....	326	127	56	209	95	59	49	63
11	.....	286	125	56	180	90	56	46	56
12	.....	293	122	62	180	95	105	46	56
13	.....	568	124	57	382	80	90	44	53
14	.....	1,726	120	56	532	72	75	46	60
15	.....	1,530	110	56	319	65	66	47	64
16	.....	1,322	108	56	244	60	58	47	64
17	.....	954	109	56	207	174	56	47	58
18	.....	966	105	56	180	346	55	46	56
19	.....	858	97	53	158	100	54	46	56
20	.....	792	85	51	146	90	49	46	54
21	.....	800	80	48	132	130	65	46	54
22	.....	808	82	49	130	95	58	38	52
23	.....	1,184	70	46	136	70	52	39	54
24	.....	1,034	66	46	132	65	56	38	56
25	.....	768	64	56	174	54	56	38	55
26	.....	744	60	120	146	46	51	38	55
27	454	1,096	57	168	124	54	46	38	54
28	470	1,334	56	203	112	49	46	37	54
29	387	1,224	56	242	103	51	52	38	54
30	.....	932	56	331	120	132	50	38	53
31	.....	718	.....	457	.....	90	46	.....	53
1917.									
1	.....	.....	5	242	137	36.00	1.75	9.4	23
2	.....	.....	10	237	135	36.00	1.60	9.4	22
3	.....	.....	25	227	131	35.00	1.50	10.3	22
4	.....	.....	40	261	131	32.00	1.35	13.7	22
5	.....	.....	60	335	131	32.00	1.25	21.0	20
6	.....	.....	175	335	125	32.00	1.14	21.0	20
7	.....	.....	300	318	120	33.00	1.71	20.0	20
8	.....	.....	410	476	120	33.00	1.71	21.0	20
9	.....	.....	486	670	109	32.00	1.71	21.0	20
10	.....	.....	562	836	108	32.00	5.90	21.0	20
11	.....	.....	660	941	99	25.00	7.80	21.0	20
12	.....	.....	2,468	1,111	98	25.00	9.90	22.0	20
13	.....	.....	1,814	920	98	25.00	12.00	27.0	20
14	.....	.....	1,814	1,367	98	19.00	12.60	26.0	20
15	.....	.....	1,814	620	100	17.00	9.90	24.0	20
16	.....	.....	1,170	524	98	15.00	9.90	21.0	20
17	.....	.....	915	476	78	18.20	9.90	21.0	25
18	.....	.....	855	502	78	11.10	9.40	21.0	26
19	.....	.....	538	306	73	7.80	9.90	21.0	26
20	.....	.....	450	269	64	6.20	9.40	20.0	26
21	.....	.....	500	239	59	5.90	9.00	21.0	28
22	.....	.....	700	222	53	5.90	9.00	21.0	28
23	.....	.....	868	210	50	5.90	9.00	21.0	28
24	.....	.....	665	192	59	3.40	8.60	25.0	28
25	.....	.....	555	180	52	2.90	8.60	24.0	28
26	.....	.....	380	168	51	3.20	8.20	21.0	28
27	.....	.....	382	162	42	3.20	9.00	21.0	28
28	.....	.....	377	158	41	3.20	7.10	31.0	28
29	.....	.....	327	159	41	2.40	7.10	30.0	28
30	.....	.....	263	159	33	1.71	7.10	27.0	29
31	.....	.....	.....	149	.....	1.90	9.00	.....	28

NOTE.—1910: Channel dry July 16 to Aug. 12.
1912: Ice in stream until Apr. 9; data inadequate for determination of daily discharge. Gage taken out by ice Apr. 9; discharge Apr. 9–14 determined from gage heights interpolated from marks indicated by observer.
1914: No flow July 8–10 and July 12 to Sept. 20.
1915: Stage-discharge relation affected by ice Mar. 18 to Apr. 1.
1917: Apr. 1–2, discharge estimated. Stage-discharge relation affected by ice Apr. 3–15 and Oct. 22–31. Discharge estimated Apr. 1–18 and Oct. 22–31 except Apr. 3, 10, 12–14, and Oct. 30, when measurements were made. Ice going out Apr. 16–30. Control shifting Apr. 19 to May 1, May 29–30, and June 24 to July 16.

Monthly discharge of Battle Creek at Nash's ranch, Sask., 1910–1917.

[Drainage area, 500 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1910.						
May 11–31	30.5	2.45	13.5	0.027	0.021	562
June	6.30	1.15	2.64	.005	.006	155
July	2.90	.00	.41	.001	.001	25
August	1.95	.00	.76	.026	.173	47
September	8.15	1.95	4.69	.009	.010	280
October	8.15	.75	4.26	.008	.009	264
November 1–15	30.50	6.30	14.30	.028	.016	425
The period					.236	1,758
1911.						
April	180	61.0	104.1	.208	.232	6,194
May	89	26.0	45.6	.091	.105	2,804
June	42	1.2	10.6	.021	.023	631
July	38	.7	9.3	.019	.022	572
August	24	1.2	9.5	.019	.022	584
September	566	1.2	117.8	.236	.263	7,009
October	52	26.0	37.7	.075	.086	2,318
November 1–15	56	38.0	46.6	.093	.052	1,386
The period					.805	21,498
1912.						
April	3,026	108	612	1.22	1.00	26,706
May	117	68	89.5	.179	.21	5,503
June	99	10.6	37.3	.075	.08	2,220
July	16.4	3.0	7.69	.015	.02	473
August	22	4.0	10.6	.021	.02	652
September	22	13.2	16.7	.033	.04	994
October	34	17.6	24.1	.048	.05	1,482
The period					1.42	38,030
1913.						
April	1,027	61	339	.678	.76	20,178
May	77	28	55.3	.111	.13	3,401
June	37	.16	13.0	.026	.03	772
July	38	5.6	21.2	.042	.05	1,304
August	19.5	1.35	9.43	.019	.02	580
September	15.0	1.35	4.93	.010	.01	293
October	22	8.1	12.4	.025	.03	762
The period					1.03	27,290
1914.						
March 14–31	76.00	27.00	43.00	.0800	.0530	1,523
April	407.00	57.00	142.00	.2650	.2960	8,450
May	65.00	.80	26.00	.480	.0560	1,599
June	1.50	.20	.97	.0018	.0020	58
July	1.50	.00	.22	.0004	.0004	14
September	10.70	.00	2.67	.0050	.0060	159
October	38.00	4.00	16.60	.0311	.0360	1,027
The period					.4490	12,830
1915.						
March 18–31	361.0	10.1	177.0	.354	.18	4,904
April	976.0	32.0	230.0	.460	.51	13,686
May	106.0	5.2	36.0	.072	.08	2,214
June	272.0	25.0	87.0	.174	.19	5,177
July	102.0	32.0	52.0	.104	.12	3,197
August	47.0	16.0	25.0	.050	.06	1,537
September	30.0	15.0	25.0	.050	.06	1,488
October	35.0	23.0	28.0	.056	.06	1,722
The period					1.26	33,925
1916.						
February 27–29	470	387	437	.874	.10	2,600
March	1,726	286	756	1.510	1.74	46,485
April	532	56	137	.274	.31	8,152
May	457	46	94	.188	.22	5,780
June	774	103	243	.486	.54	14,460
July	346	46	102	.204	.24	6,272
August	105	46	57	.114	.13	3,505
September	62	37	45	.090	.10	2,678
October	66	38	56	.112	.13	3,443
The period					3.51	93,375
1917.						
April	2,468.0	5.00	653.0	1.310	1.460	38,856
May	1,367.0	149.00	418.0	.836	.960	25,702
June	137.0	33.00	87.0	.174	.190	5,177
July	36.0	1.71	17.5	.035	.040	1,076
August	12.6	1.14	6.8	.014	.020	418
September	31.0	9.40	21.0	.042	.050	1,250
October	29.0	20.00	24.0	.048	.060	1,476
The period					2.78	73,955

Mean monthly discharge, in second-feet, of Battle Creek at Nash's ranch, Sask., 1910–1917.

Year.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total in acre-feet.
1910	.....	.....	.....	[a] 13.5	2.60	0.41	0.76	4.7	4.3	[a] 14.3	[b] 2,452
1911	.....	.....	104	46.0	10.60	9.30	9.50	118.0	38.0	[a] 47.0	22,909
1912	.....	.....	[b] 612	90.0	37.00	7.70	10.60	16.7	24.0	.....	38,030
1913	.....	.....	339	55.0	13.00	21.00	9.40	4.9	12.4	.....	27,290
1914	.....	[c] 25	142	26.0	.97	.22	0	2.7	16.6	.....	12,830
1915	.....	[c] 80	230	36.0	87.00	52.00	25.00	25.0	28.0	.....	33,925
1916	[b] 437	756	137	94.0	243.00	102.00	57.00	45.0	56.0	.....	93,375
1917	.....	[d] 4	653	418.0	87.00	17.50	6.80	21.0	24.0	.....	74,201
Average	.....	216	268	97	60	26	14.9	30	25	31	43,223
Average run-off, acre-feet.	.....	13,281	15,947	5,964	3,570	1,599	916	1,785	1,537	1,845	46,444
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	93

[a] Average for part of month assumed as monthly average.
[b] Incomplete records; not included in average.
[c] Reduced to monthly average.
[d] Estimated monthly average.

Duration of flow (number of days in the year) of Battle Creek at Nash's ranch, Sask., 1910–1917.

Flow (second-feet).	1910	1911	1912	1913	1914	1915	1916	1917	Total.
3,000	.....	.....	1	.....	.....	.....	.....	.....	1
2,000	.....	.....	2	.....	.....	.....	.....	1	3
1,500	.....	.....	3	.....	.....	.....	2	4	9
1,400	.....	.....	3	.....	.....	.....	2	4	9
1,300	.....	.....	4	.....	.....	.....	4	5	13
1,200	.....	.....	4	.....	.....	.....	5	5	14
1,100	.....	.....	4	.....	.....	.....	6	7	17
1,000	.....	.....	5	1	.....	.....	8	7	21
900	.....	.....	5	1	.....	1	11	10	28
800	.....	.....	6	3	.....	1	14	13	37
700	.....	.....	6	3	.....	4	19	14	46
600	.....	.....	7	4	.....	5	20	18	54
500	.....	2	7	5	.....	7	23	24	68
450	.....	2	7	6	.....	7	26	28	76
400	.....	3	7	8	1	7	26	29	81
350	.....	3	8	14	2	8	35	32	102
300	.....	4	8	15	3	9	46	38	123
250	.....	4	9	18	4	13	48	41	137
200	.....	5	11	19	4	18	56	47	160
150	.....	11	13	22	8	23	68	55	200
100	.....	18	34	25	18	34	103	67	299
90	.....	23	38	25	20	42	111	72	331
80	.....	32	42	26	21	46	115	72	354
70	.....	42	54	33	28	52	118	75	402
60	.....	52	58	44	34	63	147	77	475
50	.....	69	60	49	38	70	205	83	574
40	.....	92	62	59	46	90	237	87	673
30	1	126	77	73	67	143	248	100	835
20	5	146	107	86	76	103	248	159	1,030
10	28	168	167	156	89	222	248	169	1,247
9	28	172	170	161	93	223	248	183	1,278
8	34	176	174	164	96	224	248	186	1,302
7	38	181	180	167	104	225	248	191	1,334
6	56	187	188	172	108	225	248	192	1,376
5	59	189	195	182	110	228	248	196	1,407
4	75	197	199	184	114	228	248	196	1,441
3	85	204	205	188	115	228	248	201	1,474
2	113	217	206	192	116	228	248	203	1,523
1	148	226	206	203	138	228	248	214	1,611
0	159	229	206	214	158	228	248	214	1,656
No flow	30	.....	.....	.....	.....	.....	.....	.....	.....

BATTLE CREEK AT INTERNATIONAL BOUNDARY.

LOCATION.—In the SE. ¼ sec. 4, T. 1, R. 26 W. third meridian, about a quarter of a mile above the point where Battle Creek crosses the international boundary, 20 miles below Nashlyn, Sask., and 35 miles north of Chinook, Mont.

DRAINAGE AREA.—730 square miles.

RECORDS AVAILABLE.—April 1 to November 30, 1917.

GAGE.—Stevens continuous water-stage recorder referred to two vertical staff gages, one fastened to the ladder inside the well and the other in the trench over the intake pipe; all set to same datum. Obesrver, John Buckley.

DISCHARGE MEASUREMENTS.—Made from cable or by wading.

CHANNEL AND CONTROL.—Bed composed of heavy boulders, sand, and gravel; may shift slightly during spring floods. Banks high; composed of clay with gravel seams; right bank covered with light growth of brush; not subject to overflow at any stage; left bank clean, well sodded, and not likely to be overflowed; seam of gravel in left bank washed at low-water level. One channel at all stages. Control formed by boulders.

EXTREMES OS DISCHARGE.—Maximum stage recorded, 8.42 feet April 13 (discharge, 2,830 second-feet); minimum stage recorded, 1.96 feet August 13 (discharge, 0.60 second-foot).

ICE.—Observations discontinued during winter season. Stage-discharge relation affected by ice during period of spring break-up.

DIVERSIONS.—Several ditches divert water for irrigation above station.

ACCURACY.—Stage-discharge relation not permanent; affected by ice April 1–10. Rating curve based on 16 discharge measurements accurately defining curve between 1 and 323 second-feet; curve fairly well defined between 323 and 2,900 second-feet. Records good. (See note to table of daily discharge.)

COOPERATION.—Station maintained and operated jointly by the United States Geological Survey and the Reclamation Service, Department of the Interior, Canada.

Discharge measurements of Battle Creek at international boundary, 1916–17.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1916.		*Feet.*	*Sec.-ft.*	1917.		*Feet.*	*Sec.-ft.*
Oct. 24	H. W. Rowley	2.79	61.0	May 4	G. S. Wenden	3.75	236.0
Nov. 16	do	[a] 2.81	30.0	11	do	5.63	975.0
				21	A. H. Tuttle	3.80	273.0
1917.				22	G. S. Wenden	3.65	250.0
Apr. 5	G. S. Wenden	(a)	56.0	29	do	3.34	168.0
11	do	[a] 6.20	886.0	June 3	A. H. Tuttle	3.16	129.0
12	Anderson and Tuttle	[a] 6.85	1,680.0	17	do	3.05	89.0
13	G. S. Wenden	[a] 8.09	2,830.0	26	P. A. Fetterley	2.76	60.0
21	do	4.79	594.0	July 27	do	2.10	[b] 2.1
25	do	5.05	762.0	Aug. 1	A. H. Tuttle	2.01	[c] 1.5
May 2	M. D. Anderson	3.83	256.0				

[a] Ice present.
[b] Discharge was measured at miscellaneous section half a mile above gage.
[c] Discharge estimated from field inspection.

NOTE.—A. H. Tuttle and M. D. Anderson are engineers in the service of the United States Geological Survey.

Daily discharge, in second-feet, of Battle Creek at international boundary, 1917.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1917.								
1	a 5.0	311	137	42.0	1.00	7.4	28	35
2	a 15.0	271	133	42.0	.80	8.7	27	35
3	a 25.0	249	124	40.0	.90	8.7	23	33
4	a 40.0	249	129	42.0	1.10	9.4	21	36
5	a 56.0	323	129	42.0	1.20	10.0	20	37
6	a 195.0	349	124	42.0	.90	11.5	18	41
7	a 334.0	329	124	40.0	.90	18.3	18	42
8	a 473.0	417	122	40.0	.80	18.3	21	43
9	a 612.0	538	120	42.0	.70	19.2	21	33
10	a 751.0	733	115	42.0	.80	18.3	21	39
11	1,160.0	996	115	39.0	.90	16.5	22	20
12	1,580.0	1,220	112	36.0	.70	19.2	21	24
13	2,830.0	1,280	101	35.0	.60	20.0	22	23
14	2,560.0	1,030	106	36.0	1.20	28.0	21	15.6
15	2,610.0	636	128	37.0	12.00	28.0	23	17.4
16	1,860.0	516	126	30.0	17.00	21.0	24	33
17	1,230.0	467	108	27.0	13.00	22.0	24	31
18	953.0	417	103	32.0	12.00	19.2	25	30
19	718.0	352	95	28.0	13.00	16.5	25	28
20	645.0	305	85	23.0	12.00	15.6	26	22
21	645.0	265	82	18.0	11.00	16.5	26	18
22	764.0	227	74	12.0	10.00	19.2	31	18
23	942.0	208	67	8.0	8.00	17.4	16.5	17
24	937.0	182	64	8.0	5.60	30.0	22.0	17
25	748.0	174	70	6.8	4.40	33.0	24.0	10
26	516.0	172	67	5.0	3.80	28.0	9.5	12
27	480.0	158	64	2.0	2.60	28.0	18.3	14
28	467.0	156	60	1.8	2.60	28.0	18.3	14
29	446.0	160	54	1.4	3.20	22.0	21.0	10
30	374.0	152	47	1.1	5.60	23.0	23.0	12
31	.....	144	.....	1.0	8.00	.....	25.0	.....

a Estimated.

NOTE.—Stage-discharge relation affected by ice Apr. 1-10 and Nov. 21-30; discharge estimated. Discharge Apr. 11-15 computed by hourly method from recorder graph. Discharge Apr. 16 to Nov. 20 obtained by applying to rating table the mean daily gage height determined from recorder graph until Sept. 11 and from two gage readings daily for the rest of the period, except for the following periods for which the shifting-control method was used: Sept. 5, Sept. 12 to Oct. 7, Nov. 8–16, and Nov. 19–20.

Monthly discharge of Battle Creek at international boundary, 1917.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
April	2,830	5	832	49,500
May	1,280	144	419	25,800
June	137	47	99.5	5,920
July	42	1.0	25.9	1,590
August	17	.6	5.04	310
September	33	7.4	19.4	1,154
October	31	9.5	22.1	1,360
November	43	10	25.3	1,510
The period	.....	.....	.....	87,100

BATTLE CREEK NEAR CHINOOK, MONT.

LOCATION.—In sec. 3, T. 33 N., R. 19 E., 500 feet above highway bridge 4½ miles north of Chinook, in Blaine County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 22, 1905, to December 31, 1917.

GAGE.—Overhanging chain gage on left bank 500 feet above the highway bridge.

DISCHARGE MEASUREMENTS.—1905–1915, discharge measurements at high and medium stages made from cable near the gage; 1916–1917, from the highway bridge below gage. Low-water measurements made by wading near the gage.

CHANNEL AND CONTROL.—Bed of stream sandy and shifting; both banks high, not subject to overflow. Low-water control is sand bar below gage; no well-defined control at high stages.

EXTREMES OF DISCHARGE.—1905–1917: Maximum stage recorded, 11.88 feet April 10, 1917 (discharge, 6,380 second-feet); channel reported dry September 3 to October 22, 1905; July 8 to November 20, 1908; June 21 to end of year, 1910; July 22–30, 1911; September 7–23, 1913; July 14 to October 4, 1914; and August 10 to September 9, 1917.

ICE.—Stage-discharge relation seriously affected by ice from middle of November to the spring break-up.

DIVERSIONS.—About 15 ditches divert water from Battle Creek in Canada. Several ditches and small pumping plants divert water in the United States for irrigation of bottom lands along creek above station. Below the station Cook and Matheson canals divert.

REGULATION.—None.

ACCURACY.—Stage-discharge relation not permanent; affected by shifting control and by ice. Daily gage heights are mean of two readings daily to quarter-tenths or hundredths. Several discharge measurements are necessary each year to define changes in the rating curve, particularly at low stages. Records good.

Discharge measurements of Battle Creek near Chinook, Mont., 1905–1917.

Date.	Made by—	Gage height.	Discharge.
1905.		*Feet.*	*Sec.-ft.*
May 22	H. M. Morse	1.06	36
June 2	do	1.05	35
16	Stockman and Prall	1.00	31
July 3	Babb and Prall	1.35	67
18	W. B. Freeman	.73	9.5
Aug. 10	do	.80	11.1
23	C. T. Prall	.55	1.0
1906.			
Apr. 7	W. B. Freeman	1.89	116
18	Freeman and Morse	1.42	56
25	do	1.17	31.3
May 7	W. B. Freeman	1.00	19.5
19	do	.90	14.7
26	do	1.91	116
29	do	2.38	211
30	do	7.66	1,960
30	do	8.16	2,360
31	do	6.80	1,270
June 1	Freeman and Hartman	5.20	882
2	do	3.44	460
8	W. S. Hartman	9.66	2,400
13	W. B. Freeman	8.55	2,260
25	Freeman and Hartman	1.89	176
July 18	W. S. Hartman	1.16	41.1
Aug. 11	Morse and Hartman	.49	11.6
Sept. 21	W. S. Hartman	.55	22.8
Oct. 29	Follansbee and Richards	.80	35.8
1907.			
Apr. 8	Robert Follansbee	4.54	802
11	J. B. Pierson	8.17	2,180
12	do	6.55	1,480
15	do	8.35	3,090
20	do	4.88	986
24	do	6.38	1,490
27	do	4.90	997
May 3	do	4.14	697
13	do	3.37	463
27	do	2.24	233
June 13	do	1.29	94
21	do	1.34	83
25	do	1.63	133
July 6	J. B. Pierson	1.10	54
16	do	1.41	87
29	do	.78	23.5
Aug. 17	do	.45	5.3
19	Follansbee and Pierson	.42	4.0
26	J. B. Pierson	.31	2.2
Oct. 19	Follansbee and Stewart	.64	12.5
1908.			
Apr. 6	Stewart and Huch	1.57	30.4
22	A. F. Huch	1.35	62.2
May 5	do	.96	46.2
26	do	.51	9.5
June 4	do	.50	13.8
July 7	do	.20	.17
1909.			
Apr. 30	W. A. Lamb	1.11	57
May 22	do	1.56	102
June 10	do	.95	36
25	do	4.50	1,000
July 3	do	1.70	157
24	do	.75	38
Aug. 21	do	.25	6.8
Sept. 27	do	.11	1.3
1910			
Mar. 30	Raymond Richards	1.64	127
May 3	M. E. McChristie	.63	25
7	do	.48	14
13	do	.43	11
June 20	do	.05	.4
1911.			
Apr. 11	J. C. Beebe	.80	34
22	do	1.83	190
May 1	do	1.19	63
8	do	1.24	79
12	do	1.06	59
22	do	.70	24
27	do	.89	41
June 12	do	.46	9.9
20	do	.29	3.4

Discharge measurements of Battle Creek near Chinook, Mont., 1905–1917—Continued.

Date.	Made by—	Gage height.	Discharge.
1911.		*Feet.*	*Sec.-ft.*
June 26	J. C. Beebe	0.23	2.0
July 8	do	.27	3.5
Oct. 12	W. A. Lamb	.80	44
1912.			
Apr. 3	W. A. Lamb	4.30	716
May 18	R. R. Randell	1 57	105
June 2	do	1.74	115
14	do	1.16	39
27	do	.95	27
July 26	do	.42	4.8
Aug. 28	do	.58	12.2
Nov. 12	do	.81	26
1913.			
Mar. 21	R. R. Randell	1.30	6.4
Apr. 21	J. B. Stewart	2.05	173
May 3	do	1.40	83
20	do	1.32	78
June 4	do	.85	28
17	do	.50	6.1
27	do	1.00	42
July 11	do	1.05	36
24	do	.45	4.4
Aug. 5	do	.42	4.3
11	do	.35	2.8
1914.			
Apr. 28	B. E. Jones	1.42	79.0
May 16	do	1.11	53.0
June 6	do	.35	4.6
29	do	.14	.48
1915.		*Feet.*	*Sec.-ft.*
Apr. 8	B. E. Jones	4.00	641
May 1	do	.90	35
19	do	1.74	145
June 21	do	1.22	63
July 23	do	1.40	82
Aug. 10	do	.82	23
1916.			
Apr. 13	A. H. Tuttle	2.05	172
24	do	1.62	102
May 4	do	1.38	71
28	do	4.22	637
July 19	do	1.40	89
26	do	1.28	69
Aug. 15	do	1.45	95
22	do	1.04	48.1
Sept. 10	Wm. A. Lamb	1.06	47.0
Oct. 5	A. H. Tuttle	1.12	50.7
1917.			
Apr. 8	Tuttle and Anderson	4.88	1,080
9	M. D. Anderson	10.75	5,390
9	do	9.95	4,300
23	do	4.14	992
May 11	A. H. Tuttle	4.12	869
21	do	1.85	331
June 4	do	.97	161
22	do	.52	64
Aug. 1	do	.42	4.8
Sept. 22	W. A. Lamb	.18	12.2
Nov. 19	Jones and Lamb	.27	37.9

NOTE.—1905: Aug. 23, discharge estimated.
1907: Apr. 15, accuracy of results doubtful.
1908: Apr. 6, measurement made through the ice; gage height top of ice, 1.6 feet, and to under surface of ice, 1.2 feet. July 7, discharge estimated.
Apr. 3, 1912, and Mar. 20, 1913, ice present.

Daily discharge, in second-feet, of Battle Creek near Chinook, Mont., 1905–1917.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1905.								
1	.....	63	48	59	25	1	.....	13
2	.....	65	38	67	71	1	.....	13
3	.....	65	33	71	38	.....	.....	13
4	.....	59	33	67	33	.....	.....	13
5	.....	59	33	59	92	.....	.....	13
6	.....	59	33	51	59	.....	.....	13
7	.....	54	33	59	31	.....	.....	13
8	.....	53	33	48	25	.....	.....	13
9	.....	55	28	43	15	.....	.....	18
10	.....	59	23	31	13	.....	.....	26
11	.....	53	23	23	12	.....	.....	28
12	.....	51	23	25	10	.....	.....	26
13	.....	48	23	28	9	.....	.....	18
14	.....	43	28	28	6	.....	.....	18
15	.....	43	35	23	6	.....	.....	21
16	.....	43	33	15	6	.....	.....	23
17	.....	43	33	12	6	.....	.....	23
18	.....	43	31	10	6	.....	.....	28
19	.....	43	28	10	6	.....	.....	28
20	.....	43	35	9	3	.....	.....	28
21	.....	38	48	7	2	.....	.....	28
22	53	41	48	6	1	.....	.....	28
23	53	41	38	6	1	.....	8	26
24	51	38	38	6	2	.....	8	23
25	48	38	38	3	3	.....	8	23
26	51	38	38	392	3	.....	8	23
27	55	38	55	84	1	.....	8	23
28	63	38	55	71	1	.....	8	.....
29	63	38	63	33	1	.....	8	.....
30	59	41	65	92	1	.....	13	.....
31	.....	45	.....	38	1	.....	13	.....

Daily discharge, in second-feet, of Battle Creek near Chinook, Mont., 1905–1917—Contd.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1906.										
1	.....	72	24	890	175	21	27	24	35	.....
2	.....	61	24	491	155	21	27	24	35	.....
3	.....	55	24	367	144	21	26	24	35	.....
4	.....	50	24	261	130	21	25	24	35	.....
5	.....	55	24	179	115	21	23	24	35	.....
6	.....	79	24	139	97	21	22	24	35	.....
7	.....	121	21	2,050	95	21	21	23	35	.....
8	.....	92	21	4,600	90	21	15	22	39	.....
9	.....	85	18	1,040	85	21	15	18	39	.....
10	.....	99	18	1,320	79	20	15	14	43	.....
11	.....	106	16	1,230	73	16	15	10	43	.....
12	.....	109	14	1,400	69	14	15	26	43	.....
13	.....	95	12	2,130	62	14	15	27	43	.....
14	.....	79	12	715	57	13	20	27	43	.....
15	.....	66	12	453	55	12	35	27	40	.....
16	.....	61	12	828	50	12	21	27	40	.....
17	.....	61	12	275	41	12	21	27	40	.....
18	.....	61	10	227	39	12	20	31	40	.....
19	.....	50	16	196	38	12	19	31	40	.....
20	.....	50	15	212	36	12	17	35	40	.....
21	.....	45	48	155	32	12	15	35	40	.....
22	.....	43	38	137	30	12	15	35	40	.....
23	.....	40	34	206	29	15	15	35	40	.....
24	.....	36	64	206	26	18	18	35	40	.....
25	.....	32	118	212	26	18	18	35	40	.....
26	.....	32	118	296	25	21	21	35	40	.....
27	.....	28	96	265	24	21	21	35	40	.....
28	15	28	144	244	24	22	21	35	40	.....
29	26	28	310	307	23	27	21	35	40	.....
30	43	28	1,750	228	23	27	21	35	40	.....
31	53	.....	1,720	.....	22	27	.....	35	.....	.....
1907.										
1	.....	124	366	130	93	16	6	15	17	22
2	.....	124	694	119	90	15	4	15	17	23
3	.....	124	780	116	82	13	4	14	17	23
4	.....	130	517	108	72	12	3	13	17	24
5	.....	133	355	104	62	10	2	12	17	24
6	.....	673	373	98	58	10	2	12	17	25
7	.....	1,030	366	94	50	9	2	10	17	25
8	.....	812	329	90	39	8	2	10	17	25
9	.....	1,530	359	90	59	7	2	10	17	.....
10	.....	2,350	382	87	47	7	1	10	17	.....
11	.....	2,060	337	84	41	6	1	11	18	.....
12	.....	1,500	424	84	39	6	2	11	18	.....
13	.....	1,440	472	108	333	5	4	12	20	.....
14	.....	1,830	337	240	297	5	4	12	20	.....
15	.....	2,280	287	142	266	5	5	12	22	.....
16	.....	1,870	260	295	93	5	5	12	24	.....
17	.....	1,090	546	226	87	5	6	12	24	.....
18	.....	1,310	234	194	69	6	6	15	24	.....
19	.....	1,080	226	155	48	5	7	15	24	.....
20	.....	973	230	116	48	5	7	15	26	.....
21	214	1,770	210	84	46	4	15	15	25	.....
22	101	2,360	210	87	40	3	18	15	24	.....
23	240	2,050	210	130	37	3	19	16	24	.....
24	174	1,520	210	240	35	2	18	16	23	.....
25	137	1,340	359	124	33	2	17	16	22	.....
26	124	1,070	355	108	30	2	16	16	20	.....
27	124	878	230	101	30	2	13	16	18	.....
28	124	501	190	101	28	2	13	17	18	.....
29	124	337	166	98	25	1	13	17	18	.....
30	124	280	147	98	23	5	13	17	20	.....
31	124	.....	130	.....	20	7	.....	17	.....	.....

Daily discharge, in second-feet, of Battle Creek near Chinook, Mont., 1905–1917—Con.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1908.									
1	.....	30	74	9	1	.....	.....	.....	.....
2	.....	30	106	10	1	.....	.....	.....	.....
3	.....	30	95	12	1	.....	.....	.....	.....
4	.....	30	56	14	1	.....	.....	.....	.....
5	.....	30	48	19	1	.....	.....	.....	.....
6	.....	30	46	18	1	.....	.....	.....	.....
7	.....	30	42	19	1	.....	.....	.....	.....
8	.....	30	39	19	1	.....	.....	.....	.....
9	.....	30	35	18	.....	.....	.....	.....	.....
10	.....	30	30	16	.....	.....	.....	.....	.....
11	.....	38	29	14	.....	.....	.....	.....	.....
12	.....	33	29	12	.....	.....	.....	.....	.....
13	.....	38	29	13	.....	.....	.....	.....	.....
14	.....	68	28	18	.....	.....	.....	.....	.....
15	.....	111	25	22	.....	.....	.....	.....	.....
16	.....	118	22	22	.....	.....	.....	.....	.....
17	.....	190	17	17	.....	.....	.....	.....	.....
18	.....	182	17	17	.....	.....	.....	.....	.....
19	.....	137	16	15	.....	.....	.....	.....	.....
20	.....	106	15	12	.....	.....	.....	.....	.....
21	.....	77	15	9	.....	.....	.....	.....	.....
22	.....	62	15	7	.....	.....	.....	.....	.....
23	.....	64	15	6	.....	.....	.....	.....	.....
24	.....	63	14	6	.....	.....	.....	.....	.....
25	.....	58	14	5	.....	.....	.....	.....	.....
26	.....	57	10	4	.....	.....	.....	.....	.....
27	.....	56	10	3	.....	.....	.....	.....	.....
28	.....	52	10	2	.....	.....	.....	.....	.....
29	.....	56	9	2	.....	.....	.....	.....	.....
30	.....	56	9	1	.....	.....	.....	.....	.....
31	.....	.....	9	.....	.....	.....	.....	.....	.....
1909.									
1	.....	62	81	88	372	38	1.2	2.1	12.0
2	.....	81	74	81	219	30	1.2	3.0	12.0
3	.....	88	56	74	132	30	1.2	7.0	12.0
4	.....	74	74	74	93	26	1.2	7.0	12.0
5	.....	81	103	62	492	23	1.2	5.0	12.0
6	.....	36	51	51	1,770	26	1.2	5.0	12.0
7	.....	74	205	40	1,430	26	1.2	5.0	12.0
8	.....	62	528	46	800	23	1.2	5.0	12.0
9	.....	32	251	46	254	17.0	1.2	7.0	12.0
10	.....	51	154	36	540	17.0	1.2	7.0	14.5
11	.....	119	128	36	492	17.0	1.2	7.0	17.0
12	.....	74	119	32	461	17.0	1.2	5.0	20.0
13	.....	62	96	24	278	17.0	1.2	5.0	.....
14	.....	81	88	24	140	17.0	1.2	5.0	.....
15	.....	74	88	24	115	14.5	1.2	5.0	.....
16	.....	62	88	28	140	14.5	1.2	7.0	.....
17	.....	40	103	32	68	14.5	1.2	7.0	.....
18	.....	36	111	32	57	14.5	1.2	7.0	.....
19	.....	32	88	24	57	14.5	1.2	7.0	.....
20	.....	46	81	1,030	57	14.5	1.2	7.0	.....
21	.....	40	263	3,570	57	5.0	1.2	9.5	.....
22	.....	40	288	1,840	57	5.0	1.2	9.5	.....
23	40	51	1,320	1,020	52	5.0	1.2	9.5	.....
24	40	40	798	818	38	3.0	1.2	12.0	.....
25	40	40	314	1,000	34	3.0	1.2	12.0	.....
26	46	51	239	625	30	3.0	1.2	12.0	.....
27	62	81	184	540	47	1.2	1.2	12.0	.....
28	68	68	164	372	416	1.2	1.2	12.0	.....
29	40	62	154	266	149	1.2	1.2	12.0	.....
30	24	56	111	266	86	1.2	2.1	12.0	.....
31	24	.....	88	.....	62	1.2	.....	12.0	.....

Daily discharge, in second-feet, of Battle Creek near Chinook, Mont., 1905–1917—Con.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1910.									
1	.....	87	31	7.0	.....	.....	.....	.....	.....
2	.....	79	26	6.7	.....	.....	.....	.....	.....
3	.....	84	23	6.4	.....	.....	.....	.....	.....
4	.....	79	22	6.1	.....	.....	.....	.....	.....
5	.....	74	18	5.6	.....	.....	.....	.....	.....
6	.....	69	17	5.1	.....	.....	.....	.....	.....
7	209	63	16	4.6	.....	.....	.....	.....	.....
8	275	71	15	4.2	.....	.....	.....	.....	.....
9	221	79	14	3.8	.....	.....	.....	.....	.....
10	203	65	12	3.4	.....	.....	.....	.....	.....
11	203	82	13	3.0	.....	.....	.....	.....	.....
12	570	73	13	2.7	.....	.....	.....	.....	.....
13	954	72	13	2.4	.....	.....	.....	.....	.....
14	991	69	12	2.0	.....	.....	.....	.....	.....
15	713	61	13	1.7	.....	.....	.....	.....	.....
16	843	53	17	1.4	.....	.....	.....	.....	.....
17	677	51	17	1.1	.....	.....	.....	.....	.....
18	491	49	16	.8	.....	.....	.....	.....	.....
19	291	46	14	.6	.....	.....	.....	.....	.....
20	256	44	14	.4	.....	.....	.....	.....	.....
21	352	44	12	.....	.....	.....	.....	.....	.....
22	325	42	12	.....	.....	.....	.....	.....	.....
23	280	41	16	.....	.....	.....	.....	.....	.....
24	256	44	15	.....	.....	.....	.....	.....	.....
25	244	42	14	.....	.....	.....	.....	.....	.....
26	203	39	12	.....	.....	.....	.....	.....	.....
27	168	35	12	.....	.....	.....	.....	.....	.....
28	151	34	10	.....	.....	.....	.....	.....	.....
29	127	34	8.2	.....	.....	.....	.....	.....	.....
30	110	40	7.8	.....	.....	.....	.....	.....	.....
31	94	.....	7.8	.....	.....	.....	.....	.....	.....
1911.									
1	.....	95	64	35	2.0	.....	0	52	29
2	.....	72	60	37	1.9	.....	0	56	31
3	.....	60	53	36	1.8	.....	0	53	32
4	.....	53	51	35	1.8	.....	48	50	34
5	.....	46	56	31	1.6	.....	1,040	47	35
6	.....	51	56	27	1.5	.....	3,060	44	36
7	.....	43	56	25	1.5	.....	3,220	43	37
8	.....	27	74	24	6	.....	1,500	47	37
9	.....	38	74	18	12	.....	895	48	37
10	.....	33	73	15	14	.....	560	48	37
11	.....	37	69	13	10	.....	392	47	37
12	.....	40	60	13	5.6	.....	285	44	.....
13	.....	43	47	12	3.6	.....	200	43	.....
14	.....	50	42	10	2.8	.....	156	42	.....
15	.....	47	46	10	2.0	.....	120	41	.....
16	.....	117	55	9	1.9	.....	94	40	.....
17	.....	135	60	8.5	1.6	.....	82	38	.....
18	.....	100	42	7.2	1.5	.....	74	37	.....
19	.....	77	39	4.0	1.4	.....	70	35	.....
20	.....	74	34	3.8	1.1	.....	60	35	.....
21	.....	135	30	3.6	.8	.....	54	37	.....
22	.....	206	28	3.2	0	.....	56	38	.....
23	16	135	32	3.0	0	.....	59	38	.....
24	19	156	34	2.8	0	.....	156	37	.....
25	14	117	36	2.6	0	.....	235	35	.....
26	25	135	41	2.4	0	.....	211	34	.....
27	41	90	41	2.0	0	.....	188	34	.....
28	37	87	39	1.9	0	.....	146	32	.....
29	80	84	38	1.8	0	.....	97	32	.....
30	84	74	37	2.0	0	.....	56	31	.....
31	101	.....	36	.....	0	.....	.....	29	.....

Daily discharge, in second-feet, of Battle Creek near Chinook, Mont., 1905–1917—Con.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1912.										
1	.....	120	170	100	21	4.5	7.6	18	17	.....
2	.....	300	175	116	18	5.2	7.6	18	17	.....
3	.....	716	155	116	16	4.5	7.3	18	17	.....
4	.....	2,600	175	84	1,260	4.3	7.0	18	17	.....
5	.....	3,710	175	77	145	4.1	6.6	19	17	.....
6	.....	3,180	155	72	65	4.1	6.6	19	17	.....
7	.....	3,510	155	71	42	3.9	7.6	19	17	.....
8	.....	4,000	140	69	30	3.5	7.6	19	19	.....
9	.....	3,590	150	61	23	3.1	7.6	19	19	.....
10	.....	3,180	150	57	20	2.5	7.6	19	19	.....
11	.....	2,650	160	47	18	2.4	7.6	19	19	.....
12	.....	1,980	135	40	12	3.0	7.6	19	24	.....
13	.....	1,620	145	40	12	4.0	7.6	19	24	.....
14	.....	1,500	135	41	12	5.0	7.6	19	21	.....
15	.....	1,700	120	55	13	6.0	8.0	19	19	.....
16	.....	1,110	120	410	13	7.0	8.0	20	23	.....
17	.....	757	100	295	14	8	11.2	22	24	.....
18	.....	560	110	107	14	9	10.0	24	22	.....
19	.....	471	95	60	14	10	9.6	24	19	.....
20	.....	385	95	58	12	19	9.6	25	24	.....
21	.....	357	100	52	10	30	9.2	26	25	.....
22	.....	310	80	48	9	24	9.6	27	27	.....
23	.....	260	80	42	8	22	10	27	29	.....
24	.....	260	80	39	7	19	12	27	29	.....
25	.....	250	80	35	6.0	14	14	27	31	.....
26	.....	235	80	31	5.2	12	15	28	.....	.....
27	.....	210	110	25	5.2	11	17	28	.....	.....
28	.....	200	110	22	4.5	10	17	27	.....	.....
29	.....	200	110	21	5.6	10	17	22	.....	.....
30	.....	190	95	19	5.2	10	17	20	.....	.....
31	.....	.....	85	.....	4.5	8.0	.....	18	.....	.....
1913.										
1	10	2,110	92	40	98	6.1	.7	.8	5.6	16
2	10	1,420	87	36	91	5.9	.6	.8	5.6	.....
3	10	700	85	36	68	5.1	.6	.6	5.6	.....
4	10	198	83	32	59	4.7	.6	.8	5.9	.....
5	10	139	80	27	596	4.2	.6	.8	6.9	.....
6	50	107	76	23	296	3.7	.4	1.0	8.4	.....
7	100	83	72	17	102	3.5	.....	1.3	11	.....
8	500	70	70	16	70	3.4	.....	1.5	11	.....
9	1,080	65	73	16	62	3.7	.....	4.9	11	.....
10	570	83	65	13	50	3.7	.....	5.1	13	.....
11	282	123	62	13	39	3.4	.....	5.6	13	.....
12	87	538	56	10	33	3.0	.....	6.1	15	.....
13	50	332	56	10	31	2.8	.....	4.7	16	.....
14	30	282	65	8.0	24	2.3	.....	4.2	16	.....
15	20	332	70	8.0	22	2.2	.....	4.2	16	.....
16	10	538	73	6.1	18	2.0	.....	3.7	14	.....
17	10	840	81	5.9	14	2.0	.....	3.7	14	.....
18	6	478	85	5.1	11	2.0	.....	3.7	16	.....
19	6	282	86	4.7	7.7	1.9	.....	3.7	16	.....
20	6	216	75	9.2	5.6	1.5	.....	4.2	16	.....
21	6	173	72	4.9	5.1	.7	.....	5.1	14	.....
22	6	158	70	4.9	5.6	.6	.....	5.6	16	.....
23	6	158	67	4.9	5.4	.4	.....	5.9	15	.....
24	6	152	65	99	4.7	.4	.8	5.6	14	.....
25	6	139	59	83	11	.4	1.2	5.1	15	.....
26	6	125	56	52	15	2.0	1.0	4.9	17	.....
27	6	107	54	42	15	2.0	1.3	4.9	22	.....
28	50	99	52	38	11	3.4	1.0	4.9	24	.....
29	100	97	48	37	6.9	3.0	1.0	4.7	25	.....
30	500	95	44	83	6.1	1.9	.8	4.7	25	.....
31	1,000	.....	41	.....	5.6	1.0	.....	5.4	.....	.....

Daily discharge, in second-feet, of Battle Creek near Chinook, Mont., 1905–1917—Con.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1914.									
1	.....	54	67	3.0	0.3	.....	.....	.....	10
2	.....	270	61	2.8	.2	.....	.....	.....	7.8
3	.....	207	55	2.4	.2	.....	.....	.....	7.5
4	.....	163	68	4.5	.2	.....	.....	.....	9.0
5	.....	163	112	4.5	.2	.....	.....	30	8.7
6	.....	105	65	4.5	.2	.....	.....	46	8.7
7	.....	92	49	3.9	.1	.....	.....	30	9.0
8	.....	86	38	2.4	.1	.....	.....	72	13
9	.....	85	36	2.0	.1	.....	.....	996	13
10	.....	81	38	1.6	.1	.....	.....	478	12
11	.....	75	40	1.6	.1	.....	.....	172	11
12	.....	112	33	3.9	.1	.....	.....	98	11
13	.....	140	31	4.5	.1	.....	.....	72	12
14	.....	125	31	6.0	.....	.....	.....	62	11
15	207	140	30	26	.....	.....	.....	54	14
16	478	258	49	13	.....	.....	.....	43	16
17	418	650	38	5.1	.....	.....	.....	37	16
18	216	478	36	3.3	.....	.....	.....	31	16
19	132	332	36	2.8	.....	.....	.....	27	16
20	118	226	34	2.0	.....	.....	.....	24	18
21	140	172	27	1.8	.....	.....	.....	24	18
22	92	132	22	1.2	.....	.....	.....	27	18
23	86	118	22	.6	.....	.....	.....	24	18
24	98	112	20	1.1	.....	.....	.....	22	15
25	98	98	18	1.6	.....	.....	.....	19	13
26	98	86	11	2.0	.....	.....	.....	18	12
27	98	84	8.7	1.5	.....	.....	.....	18	12
28	98	81	7.2	1.0	.....	.....	.....	15	12
29	92	73	6.3	.4	.....	.....	.....	14	12
30	86	69	4.2	.4	.....	.....	.....	14	12
31	68	.....	3.3	.....	.....	.....	.....	13	.....
1915.									
1	.....	.....	35	25	42	41	16	23	25
2	.....	.....	32	47	42	39	19	23	25
3	.....	.....	31	42	41	42	19	24	25
4	.....	.....	28	40	40	41	22	25	25
5	.....	.....	25	40	36	40	17	25	25
6	.....	.....	23	95	33	40	16	25	28
7	.....	.....	23	129	47	39	16	25	28
8	.....	641	23	190	65	38	16	25	28
9	.....	341	23	235	58	32	16	25	28
10	.....	266	23	198	62	23	18	25	28
11	.....	190	22	143	53	22	22	28	28
12	.....	136	16	122	52	20	28	30	28
13	.....	116	14	109	48	17	32	32	28
14	.....	109	14	97	46	15	34	32	28
15	.....	95	116	83	44	13	31	32	28
16	.....	86	284	80	41	14	30	32	28
17	.....	83	401	76	46	16	28	32	28
18	.....	78	164	67	207	18	28	32	28
19	.....	74	132	65	216	12	28	34	28
20	.....	70	102	65	136	11	28	34	28
21	.....	63	105	65	109	181	28	34	.....
22	.....	60	95	65	97	198	27	37	.....
23	.....	58	85	64	92	129	24	37	.....
24	.....	54	82	61	80	97	23	31	.....
25	.....	46	77	52	65	50	23	27	.....
26	.....	42	87	52	58	40	23	23	.....
27	.....	41	75	50	55	31	23	23	.....
28	.....	39	45	44	53	25	23	23	.....
29	.....	39	43	42	52	22	23	25	.....
30	.....	36	38	42	54	15	23	25	.....
31	.....	.....	29	.....	50	13	.....	25	.....

Daily discharge, in second-feet, of Battle Creek near Chinook, Mont., 1905–1917—Con.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1916.									
1	.....	1,350	73	554	235	109	46	41	56
2	.....	1,230	73	740	158	74	45	47	55
3	.....	640	73	920	207	59	45	48	54
4	.....	485	73	515	870	50	48	59	54
5	.....	319	68	364	255	47	51	58	54
6	.....	245	68	297	675	47	48	65	53
7	.....	216	68	255	545	43	46	63	52
8	.....	198	68	226	216	41	44	63	52
9	.....	181	68	319	158	80	47	63	52
10	.....	165	68	575	122	97	47	63	52
11	.....	150	68	255	109	85	45	63	52
12	.....	173	68	190	85	80	47	61	52
13	2,100	165	68	181	63	80	47	61	52
14	1,350	165	68	216	91	80	44	63	52
15	1,350	157	68	460	85	85	41	63	56
16	1,670	156	68	435	74	74	38	63	65
17	1,190	155	68	297	68	63	37	63	70
18	790	146	62	235	68	58	36	63	72
19	341	137	62	181	216	51	34	63	72
20	460	130	57	173	226	48	34	63	72
21	2,190	128	57	158	150	46	33	63	72
22	3,220	120	57	150	122	44	32	63	72
23	2,780	113	57	143	103	41	32	62	72
24	1,830	103	62	136	97	40	32	61	72
25	1,510	97	123	129	80	44	32	59	70
26	1,630	85	376	129	74	47	32	58	70
27	3,220	79	670	150	74	46	32	58	70
28	3,720	73	640	136	74	44	32	58	70
29	2,780	73	502	136	80	41	33	58	70
30	2,730	73	376	165	85	40	34	56	70
31	1,830	.....	845	.....	122	42	.....	56	.....

Daily discharge, in second-feet, of Battle Creek near Chinook, Mont., 1905–1917—Con.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1917.									
1	.....	411	363	182	46	4.0	.....	28	24
2	.....	411	341	174	46	3.2	.....	27	24
3	.....	515	298	174	44	3.0	.....	26	23
4	.....	640	277	166	40	2.6	.....	23	23
5	.....	1,190	298	166	36	2.0	.....	21	23
6	.....	1,200	363	162	33	1.4	.....	21	24
7	.....	640	385	156	31	.8	.....	21	25
8	.....	1,030	407	152	30	.4	.....	20	27
9	.....	4,050	548	147	29	.2	.....	20	34
10	.....	5,500	692	144	28	.....	8.0	20	34
11	.....	2,570	910	150	27	.....	12	19	34
12	.....	2,710	1,130	148	26	.....	14	19	35
13	.....	2,020	1,340	145	25	.....	16	18	35
14	.....	2,990	1,130	121	23	.....	16	18	35
15	.....	3,300	920	120	22	.....	18	18	35
16	.....	2,260	710	126	22	.....	17	18	.....
17	.....	1,380	500	112	20	.....	21	18	.....
18	.....	1,000	476	95	16	.....	21	18	.....
19	.....	765	453	88	14	.....	21	17	.....
20	.....	765	385	80	13	.....	20	16	.....
21	.....	820	341	77	12	.....	16	20	.....
22	.....	820	319	67	11	.....	12	22	.....
23	.....	925	298	60	8.8	.....	12	23	.....
24	.....	970	277	58	7.4	.....	26	25	.....
25	.....	880	247	55	6.8	.....	30	25	.....
26	.....	716	217	52	5.6	.....	31	25	.....
27	.....	548	208	50	4.6	.....	31	25	.....
28	.....	524	208	48	4.2	.....	30	25	.....
29	.....	476	208	47	3.8	.....	28	25	.....
30	.....	430	199	46	3.6	.....	28	25	.....
31	.....	.....	199	.....	3.4	.....	.....	24	.....

NOTE.—1905: Channel dry Sept. 3 to Oct. 22.

1906: Stage-discharge relation affected by ice Jan. 1 to Mar. 27 and Nov. 15 to Dec. 31; discharge estimated Nov. 15–30.

1907: Ice reported Jan. 1 to Apr. 6, but open-channel rating curve was used to determine discharge beginning Mar. 21 and results do not appear high; there was a large flow in Milk River at Havre beginning Mar. 21. Creek frozen Dec. 9–31 and there was a small amount of ice in November; discharge Nov. 10–15 estimated.

1908: Stage-discharge relation affected by ice Jan. 1 to Apr. 10, and Nov. 20 to Dec. 31; discharge Apr. 1–10 estimated. Practically no flow July 9 to Nov. 19.

1909: Stage-discharge relation affected by ice Jan. 1 to Mar. 22 and Nov. 13 to Dec. 31.

1910: Stage-discharge relation affected by ice Jan. 1 to Feb. 28. Mean discharge estimated Mar. 1–6 at 183 second-feet. Channel dry June 21 to Dec. 31.

1911: Channel probably dry until Feb. 28. Mean discharge estimated as follows: Mar. 1–22, 8 second-feet; Nov. 12–30, 25 second-feet. Channel dry July 22 to Sept. 3.

1912: Stage-discharge relation affected by ice Mar. 24 to Apr. 3; discharge Apr. 1–2 estimated; discharge Apr. 3 determined by current-meter measurement.

1913: Discharge estimated Mar. 1–8, 13–19, 21–31, and Aug. 23–25. Channel practically dry Sept. 7–23.

1914: July 14 to Oct. 4, channel practically dry. Stage-discharge relation affected by ice Dec. 1–11, and record for November is questionable because of possible ice effect.

1916: Stage-discharge relation affected by ice Nov. 23–30; discharge estimated.

1917: May 14–16, discharge interpolated. Aug. 6–10, discharge estimated. Aug. 10 to Sept. 9, pool stage; observer notes "No water under gage; very little water flowing." Nov. 16–30, stage-discharge relation affected by ice; discharge estimated at 20 second-feet.

Monthly discharge of Battle Creek near Chinook, Mont., 1905–1917.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1905.				
April 22–30	63	48	55	984
May	65	38	48	2,933
June	65	23	37	2,208
July	392	3	48	2,927
August	92	1	16	972
September	1	0	0	0
October	13	0	2.6	160
November 1–27	28	13	21	1,119
The period	.....	.....	.....	11,300
1906.				
March 28–31	53	15	34.2	271
April	121	28	61.6	3,670
May	1,750	10	155	9,530
June	4,600	137	709	42,200
July	175	22	63.5	3,900
August	27	12	18.0	1,110
September	35	15	20.0	1,190
October	35	10	28.2	1,730
ovember	43	35	39.3	2,340
The period	.....	.....	.....	65,900
1907.				
March 21–31	240	101	146	3,190
April	2,360	124	1,150	68,400
May	780	130	332	20,400
June	295	84	128	7,620
July	333	20	74.8	4,600
August	16	1	6.2	381
September	19	1	7.7	458
October	17	10	13.7	842
November	26	17	20.1	1,200
December 1–8	25	22	23.9	379
The period	.....	.....	.....	107,000
1908.				
April	190	30	64.1	3,810
May	106	9	29.9	1,840
June	19	1	12.0	714
The period	.....	.....	.....	6,360
1909.				
March 23–31	68	24	42.7	762
April	119	32	59.9	3,560
May	1,320	51	209	12,900
June	3,570	24	407	24,200
July	1,770	30	290	17,800
August	38	1.2	14.2	873
September	2.1	1.2	1.23	73.2
October	12	2.1	7.73	475
November 1–12	20	12	13.3	317
The period	.....	.....	.....	61,000
1910.				
March	991	.....	332	20,400
April	87	34	58.2	3,460
May	31	7.8	14.9	916
June	7	0	2.3	137
July	.....	.....	0	0
August	.....	.....	0	0
September	.....	.....	0	0
October	.....	.....	0	0
November	.....	.....	0	0
December	.....	.....	0	0
The period	.....	.....	.....	24,900
1911.				
March	101	.....	19.1	1,170
April	206	27	81.9	4,870
May	74	28	48.5	2,980
June	37	1.8	13.3	791
July	14	0	2.46	151
August	0	0	.0	0
September	3,220	0	437	26,000
October	56	29	40.9	2,510
November	37	.....	28.6	1,700
The period	.....	.....	.....	40,200

Monthly discharge of Battle Creek near Chinook, Mont., 1905–1917—Continued.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1912.				
April	4,000	120	1,340	79,700
May	175	80	123	7,560
June	410	19	77.0	4,580
July	1,260	4.5	59.5	3,660
August	30	2.4	9.13	561
September	17	6.6	9.92	590
October	28	18	21.7	1,330
November	31	17	21.5	1,070
The period				99,100
1913.				
March	1,080	6	147	9,040
April	2,110	65	341	20,300
May	92	41	68.4	4,210
June	99	4.7	26.2	1,560
July	596	4.7	57.7	3,550
August	6.1	.4	2.67	164
September	1.3	.0	.35	21
October	6.1	.6	3.81	234
November	25	5.6	14.1	839
The period				39,900
1914.				
March 15–31	478	68	154	5,190
April	650	54	162	9,640
May	112	3.3	35.4	2,180
June	26	.4	3.71	221
July	.3	.0	.064	3.9
October	996	.0	80.0	4,920
November	18	7.5	12.7	756
The period				22,900
1915.				
April 8–30	641	36	120	5,470
May	401	14	73.9	4,540
June	235	25	82.8	4,930
July	216	33	68.4	4,210
August	198	11	43.0	2,640
September	34	16	23.5	1,400
October	37	23	28.2	1,730
November 1–20	28	25	27.2	1,080
The period				26,000
1916.				
March 13–31	3,720	341	1,930	72,700
April	1,350	73	250	14,900
May	845	57	165	10,100
June	920	129	294	17,500
July	870	63	180	11,100
August	109	40	58.9	3,620
September	51	32	39.8	2,370
October	65	41	59.6	3,670
November	72	52	61.9	3,680
The period				140,000
1917.				
April	5,500	411	1,420	84,500
May	1,340	199	472	29,000
June	182	46	112	6,660
July	46	3.4	20.7	1,270
August	4.0	0	.57	35
September	31	0	14.3	851
October	28	16	21.6	1,330
November	35	20	25.2	1,500
The period				125,000

NOTE.—Estimated monthly means as originally published for March, November, and December, 1908; January and February, 1910; and December, 1911, have been omitted from compilation; base data considered inadequate. The flow for January and February, 1911, was estimated at zero, which is probably correct.

Mean monthly discharge, in second-feet, of Battle Creek near Chinook, Mont., 1905–1917.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total in acre-feet.
1905	.....	[a] 55	48	37	48	16	0	2.6	[b] 21	.....	11,300
1906	[c] 34.2	61.6	155	709	63.5	18.0	20.0	28.2	39.3	.....	65,900
1907	[d] 146	1,150	332	128	74.8	6.2	7.7	13.7	20.1	[e] 23.9	107,000
1908	.....	64.1	29.9	12.0	0	0	0	0	.....	.....	6,360
1909	[f] 42.7	59.9	209	407	290	14.2	1.23	7.73	[g] 13.3	.....	61,000
1910	332	58.2	14.9	2.3	0	0	0	0	0	0	24,900
1911	19.1	81.9	48.5	13.3	2.46	0	437	40.9	28.6	.....	40,200
1912	.....	1,340	123	77.0	59.5	9.13	9.92	21.7	21.5	.....	99,100
1913	147	341	68.4	26.2	57.7	2.67	.35	3.81	14.1	.....	39,900
1914	[h] 154	162	35.4	3.71	.064	0	0	80.0	12.7	.....	22,900
1915	.....	[k] 120	73.9	82.8	68.4	43.0	23.5	28.2	27.2	.....	26,000
1916	[l] 1,930	250	165	294	180	58.9	39.8	59.6	61.9	.....	140,000
1917	.....	1,420	472	112	20.7	0.57	14.3	21.6	29	.....	153,000
Average	.....	426	137	146	66.6	13.0	42.6	23.7	24.1	.....	61,400
Median	.....	141	73.9	77.0	57.7	6.2	7.7	21.6	20.8	.....	40,200
Maximum	.....	1,420	472	709	290	58.9	437	80.0	61.9	.....	153,000
Minimum	.....	58.2	14.9	2.3	0	0	0	0	0	.....	6,360

[a] Apr. 22–30. [b] Nov. 1–27. [c] Mar. 28–31. [d] Mar. 21–31. [e] Dec. 1–8. [f] Mar. 23–31. [g] Nov. 1–12. [h] Mar. 15–31. [k] Apr. 8–30. [l] Mar. 13–31.

NOTE.—Means for less than a full month but exceeding 15 days were considered means for the month in finding the average and median flow. The median flow given was obtained by arranging the monthly means in their order of magnitude and taking the middle mean, or, if their number was even, the average of the two middle means. By using daily discharge a considerably lower median discharge would be obtained. The total yearly flow in acre-feet has been averaged because in general the period of record covers the open-water season and the flow during months for which records are missing was usually small.

SIXMILE CREEK AT SODERSTROM'S RANCH, SASK.

LOCATION.—In sec. 29, T. 7, R. 28 W. third meridian, 200 yards west of the surveyed trail from Maple Creek to Battle Creek, and about 30 miles south of Maple Creek.

DRAINAGE AREA.—27 square miles.

RECORDS AVAILABLE.—July 22, 1909, to June 10, 1911.

GAGE.—Vertical staff; read by J. M. Soderstrom.

DISCHARGE MEASUREMENTS.—Made by wading or, at very low stages, with weir.

CHANNEL AND CONTROL.—Bed of stream sand and coarse gravel with clay at banks. Banks high; not subject to overflow. One channel at all stages. Control not likely to shift.

EXTREMES OF DISCHARGE.—1909–1911: Maximum stage recorded, 2.5 feet July 28, 1909 (discharge, 34 second-feet); minimum stage recorded, 0.40 foot July 16 to August 5 and September 2 to 6, 1910 (no flow).

ICE.—Station not maintained during winter season.

ACCURACY.—Stage-discharge relation fairly permanent. Gage read once daily to hundredths during open-water periods. Records fair.

Discharge measurements of Sixmile Creek at Soderstrom's ranch, Sask., 1909–1911.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1909.		*Feet.*	*Sec.-ft.*	1910		*Feet.*	*Sec.-ft.*
July 2	H. R. Carscallen.....	.....	17.2	Aug. 18	H. R. Carscallen.....	0.56	[a] 0.07
22	.....do.....	1.47	3.8	Sept. 6	.....do.....	.86	.88
Sept. 9	.....do.....	.87	.32	8	.....do.....	1.00	1.62
30	.....do.....	.83	.33	29	R. G. Swan.....	.66	[a] .25
Nov. 5	.....do.....	1.12	1.17				
1910.				1911.			
Apr. 23	.....do.....	1.25	2.76	May 1	H. M. French.....	2.43	17.75
May 17	.....do.....	1.69	6.39	27	.....do.....	2.25	11.21
June 23	.....do.....	.79	[a] .59	June 19	.....do.....	.98	1.74
July 15	.....do.....	.49	[a] .03	30	.....do.....	1.95	6.77
Aug. 3	.....do.....	.40	0	Sept. 13	.....do.....	2.76	18.45

[a] Discharge measured by using 15-inch weir.

Daily discharge, in second-feet, of Sixmile Creek at Soderstrom's ranch, Sask., 1909–1911.

Day.	July.	Aug.	Sept.	Oct.	Nov.	Day.	July.	Aug.	Sept.	Oct.	Nov.
1909.											
1	.....	11.00	0.7	0.1	1.6	16	.....	2.3	0.7	1.07	.....
2	.....	8.70	.7	.05	1.6	17	.....	2.3	.7	1.07	.....
3	.....	5.4	.7	.02	1.07	18	.....	2.3	.7	1.6	.....
4	.....	6.9	.7	.02	1.07	19	.....	1.6	.7	1.6	.....
5	.....	8.7	.7	.05	1.07	20	.....	1.6	.7	1.6	.....
6	.....	8.7	.7	.05	1.07	21	.....	1.07	.7	1.6	.....
7	.....	6.90	.7	.1	1.07	22	4 2	1.07	.7	1.07	.....
8	.....	8.7	.4	.4	1.07	23	3.1	1.07	.7	1.07	.....
9	.....	6.9	.4	.7	.....	24	3.1	1.07	.7	1.6	.....
10	.....	5.4	.4	.7	.....	25	3.1	1.07	.7	1.6	.....
11	.....	5.4	.7	.7	.....	26	6.9	1.07	.7	1.6	.....
12	.....	5.4	.7	.7	.....	27	10.5	.7	.4	1.6	.....
13	.....	4.2	.7	.7	.....	28	34.5	.7	.4	1.07	.....
14	.....	4.2	1.07	1.07	.....	29	16.7	.7	.4	1.6	.....
15	.....	3.1	1.07	1.07	.....	30	13.80	.7	.2	1.6	.....
						31	11.00	.7	.....	2.30	.....

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1910.							
1	10.7	1.9	1.9	0.35	0.00	0.05	0.35
2	11.8	2.4	1.4	.95	.00	.00	.35
3	11.8	2.4	3.1	.60	.00	.00	.35
4	13.0	1.9	1.9	.95	.00	.00	.15
5	11.8	1.9	1.9	.60	.00	.00	.95
6	11.8	1.9	1.4	.15	.60	.00	.60
7	10.7	1.9	1.4	.15	.35	.95	.60
8	10.7	1.9	.95	.15	.15	.95	.35
9	10.7	1.9	.95	.95	.15	.60	.35
10	9.6	1.9	.95	.35	.15	.35	.35
11	9.6	3.8	.60	1.40	.05	.95	.35
12	8.5	3.1	1.40	.35	.05	.60	.35
13	8.5	3.1	.95	.35	.05	.60	.35
14	7.5	3.1	.95	.15	.35	.60	.35
15	6.5	3.1	.60	.05	.60	.60	.35
16	5.5	8.0	.60	.00	.35	.60	.35
17	5.5	7.5	.60	.00	.15	.60	.35
18	4.6	4.6	1.40	.00	.15	.60	.35
19	3.8	5.5	.60	.00	.05	.60	1.40
20	4.6	5.5	.95	.00	.05	.35	1.40
21	3.8	4.6	.60	.00	.05	.35	.95
22	3.8	3.8	.35	.00	.00	.35	.95
23	3.1	3.1	.60	.00	.00	.35	.60
24	3.1	2.4	.60	.00	.60	.95	.60
25	3.1	1.9	.35	.00	.60	.95	.35
26	2.4	1.4	.35	.00	.35	.60	.35
27	2.4	.95	.15	.00	.35	.60	.95
28	1.9	1.9	.05	.00	.15	.60	1.40
29	1.4	1.9	.15	.00	.15	.35	.95
30	1.4	1.4	.05	.00	.05	.35	.95
31	.....	1.9	.....	.00	.05	.....	.95

Day.	Apr.	May.	June.	Day.	Apr.	May.	June.	Day.	Apr.	May.	June.
1911.											
1	13.1	13.2	6.7	11	12.2	6.0	.....	21	12.5	6.2	.....
2	13.1	11.5	6.4	12	12.2	5.8	.....	22	12.5	6.0	.....
3	13.1	10.9	6.0	13	12.1	5.7	.....	23	12.5	5.8	.....
4	13.1	9.3	5.8	14	12.4	5.5	.....	24	11.8	6.2	.....
5	13.1	7.9	5.7	15	12.6	7.1	.....	25	9.3	11.4	.....
6	13.1	6.0	5.5	16	14.8	8.1	.....	26	8.5	10.5	.....
7	13.1	5.8	5.3	17	14.0	7.1	.....	27	8.1	10.3	.....
8	14.6	5.7	8.1	18	16.3	6.2	.....	28	8.1	9.8	.....
9	16.3	5.3	7.1	19	14.6	5.8	.....	29	14.0	8.6	.....
10	12.2	5.2	6.9	20	14.0	6.2	.....	30	29.1	8.1	.....
								31	.....	7.1	.....

Monthly discharge of Sixmile Creek at Soderstrom's ranch, Sask., 1909–1911.

	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1909.						
July 22–31	34.5	3.13	10.7	0.511	0.190	213
August	11.0	.70	3.85	.183	.211	237
September	1.1	.20	.65	.031	.035	39
October	2.3	.02	.97	.046	.053	60
November 1–8	1.6	1.07	1.20	.057	.017	19
The period						563
1910.						
April	13.00	1.40	6.79	.323	.360	404
May	8.00	.95	2.99	.142	.164	184
June	3.10	.05	.92	.044	.049	55
July	1.40	.00	.24	.011	.013	15
August	.60	.00	.18	.009	.010	11
September	.95	.00	.48	.023	.026	29
October	1.40	.15	.61	.029	.033	38
The period						736
1911.						
April	29.1	8.1	13.2	.489	.546	786
May	13.2	5.2	7.6	.281	.324	467
June (1–10)	8.1	5.3	6.4	.237	.088	127
The period					.958	1,380

SIXMILE CREEK AT SPANGLER'S RANCH, SASK.

LOCATION.—In SW. ¼ sec. 6, T. 7, R. 28 W. third meridian, near Spangler's house, 4 miles above junction with Battle Creek, and about 33 miles southwest of Maple Creek.

DRAINAGE AREA.—42 square miles.

RECORDS AVAILABLE.—Open-water flow July 4, 1911, to November 11, 1916, when station was discontinued. Previous to 1912 records were taken at another station about 850 feet downstream.

GAGE.—Vertical staff; read by D. B. Spangler.

DISCHARGE MEASUREMENTS.—Made by wading or, at low stages, with weir.

CHANNEL AND CONTROL.—Bed of stream sandy. Banks high; not subject to overflow. One channel at all stages. Control. A permanent 6-foot weir installed 175 feet below gage September 8, 1915.

EXTREMES OF DISCHARGE.—1911–1916: Maximum stage recorded, 6.51 feet February 16, 1916 (discharge, 167 second-feet); no flow September 19 to 21, 1914.

ICE.—Station not maintained during winter season.

DIVERSION.—Water is diverted by J. M. Spangler for irrigation one-half mile upstream.

ACCURACY.—Stage-discharge relation affected by ice during periods of spring break-up. Gage read to hundredths at least once daily. Daily discharge obtained by applying mean daily gage heights to rating table. Records good.

Discharge measurements of Sixmile Creek at Spangler's ranch, Sask., 1911–1916.

Date.	Made by—	Gage height.	Discharge.
1911.		*Feet.*	*Sec.-ft.*
July 3	M. H. French	1.26	3.59
4	do	1.29	2.92
31	do	.73	[a].46
Aug. 22	do	.75	[a].22
Sept. 8	do	5.69	69.77
14	do	3.00	18.46
Oct. 30	do	1.35	4.50
1912.			
Apr. 13	do	4.10	33.50
May 3	do	2.45	11.66
June 4	G. R. Elliott	2.03	4.92
17	O. H. Hoover	2.05	6.49
19	do	2.12	6.52
20	do	2.21	6.82
July 12	G. R. Elliott	1.60	.29
Aug. 8	do	1.70	.58
Sept. 7	do	1.82	1.27
Oct. 3	do	1.85	1.87
Nov. 14	do	1.93	3.39
27	do	1.75	.81
1913.			
Apr. 25	H. D. St. A. Smith	2.48	11.90
June 4	do	1.84	1.58
4	H. O. Brown	1.89	2.60
10	do	1.60	[a].22
26	H. D. St. A. Smith	1.98	3.70
July 26	do	1.83	1.41
Aug. 15	do	1.56	[a].08
Sept. 10	do	1.49	.....
Oct. 3	do	1.51	.....
26	do	1.67	1.34
1914.			
June 5	H. W. Rowley	1.56	.18
23	H. W. Rowley	1.65	0.45
July 16	do	1.40	0
20	do	1.55	0
Aug. 1	do	.73	0
11	do	Dry.	0
Sept. 3	do	.47	0
Nov. 4	do	1.57	.08
1915.			
Mar. 26	H. R. Carscallen	3.45	8.50
Apr. 2	do	2.58	9.60
17	H. W. Rowley	2.20	8.20
May 19	do	2.39	10.20
June 5	do	3.60	25.00
25	do	2.10	5.20
Aug. 4	do	2.02	2.90
28	do	1.75	.55
Sept. 18	do	2.50	3.50
Oct. 16	do	2.60	5.40
Nov. 5	do	2.43	2.30
1916			
Mar. 27	P. A. Fetterley	3.62	[b]21.00
April 1	do	2.97	[b]10.20
8	do	2.81	[b]7.50
15	do	2.72	[b]7.90
20	H. W. Rowley	2.63	[b]7.80
May 12	do	2.70	[a]7.00
31	do	5.09	[c]88.00
June 24	do	3.59	[b]24.00
26	do	3.32	[b]19.20
July 20	do	2.66	[a]5.80
Aug. 11	do	2.77	[a]7.80
30	do	2.51	[a]2.90
Sept. 26	V. A. Newhall and H. W. Rowley	2.48	[a]2.50
Nov. 13	H. W. Rowley	[d]2.40	[a]1.27

[a] Weir measurement.
[b] Measurement made at miscellaneous sections below gage.
[c] Measurement made at miscellaneous sections above gage.
[d] Gage height affected by backwater from ice on control.

Daily discharge, in second-feet, of Sixmile Creek at Spangler's ranch, Sask., 1911–1916.

Day.	July.	Aug.	Sept.	Oct.	Nov.	Day.	July.	Aug.	Sept.	Oct.	Nov.
1911.						1911.					
1	.....	0.2	0.4	9.3	4.1	16	0.2	1.5	12.0	3.7	.....
2	.....	.2	.2	9.1	.....	17	.3	1.1	10.9	3.6	.....
3	3.0	.2	.2	8.9	.....	18	.3	1.2	10.3	2.8	.....
4	2.6	.2	2.6	9.0	4.5	19	.3	.5	9.6	2.0	.....
5	2.0	.3	53.0	8.8	4.0	20	.4	.8	8.3	3.4	.....
6	1.8	.5	92.0	8.5	3.4	21	.4	.6	7.4	4.2	.....
7	1.7	.6	94.0	7.4	3.1	22	.4	.4	7.7	8.8	.....
8	1.6	4.1	72.0	7.1	.....	23	.4	.2	7.9	7.4	.....
9	1.2	4.4	41.0	6.5	.....	24	.4	.3	8.2	5.4	.....
10	.8	4.0	41.0	5.9	.....	25	.4	.4	9.1	5.0	.....
11	.6	3.3	35.0	5.5	.....	26	.4	.5	9.8	4.6	.....
12	.4	2.6	24.0	5.2	.....	27	.4	.9	10.3	3.6	.....
13	.4	2.1	20.0	4.8	.....	28	.4	1.0	10.0	2.4	.....
14	.3	1.8	19.0	4.2	.....	29	.4	.8	9.6	3.5	.....
15	.2	1.6	18.0	4.0	.....	30	.3	.6	9.5	3.7	.....
						31	.2	.4	.....	4.0	.....

Daily discharge, in second-feet, of Sixmile Creek at Spangler's ranch, Sask., 1911–1916—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1912.								
1	.....	11.12	7.60	2.00	0.34	0.95	2.32	2.48
2	.....	10.80	6.00	1.58	.38	1.04	2.32	2.16
3	.....	11.60	4.88	1.12	.38	1.04	2.00	2.48
4	.....	11.60	4.40	.68	.38	.95	2.00	2.00
5	.....	13.20	4.40	.68	.45	1.12	1.84	1.86
6	.....	15.60	1.30	.56	.56	1.21	1.84	1.72
7	.....	18.80	.56	.49	.56	1.58	2.00	2.00
8	.....	15.60	.29	.52	.56	1.44	2.16	1.58
9	.....	13.20	.17	.49	.49	1.44	3.12	2.00
10	.....	10.80	.10	.32	.49	1.30	2.96	2.48
11	.....	a9.20	.05	.38	.49	1.12	3.12	2.80
12	.....	a7.60	.02	.29	.52	1.12	3.28	2.64
13	.....	a6.00	.00	.36	.52	1.21	3.44	3.28
14	38.10	a4.40	4.40	.29	.52	.95	3.60	3.28
15	37.05	a4.40	10.80	.56	.56	1.44	4.40	3.44
16	38.10	4.40	9.20	.38	.86	1.44	5.20	.....
17	34.35	4.40	6.00	.38	.86	1.30	6.00	.....
18	34.35	3.60	4.40	.38	.86	1.21	5.20	.....
19	32.70	a4.40	7.60	.38	1.12	1.44	4.40	.....
20	32.25	4.40	6.00	.38	1.30	2.48	4.40	.....
21	31.61	4.40	6.00	.34	1.21	2.48	4.56	.....
22	30.25	4.08	6.00	.34	1.12	2.48	4.72	.....
23	28.75	4.08	6.00	.34	1.12	3.12	4.56	.....
24	27.55	3.60	6.00	.34	1.04	3.69	4.40	.....
25	24.12	3.44	5.68	.32	1.04	3.44	3.24	.....
26	16.40	4.08	5.20	.38	.95	2.96	4.40	.....
27	14.96	4.40	4.40	.38	.86	2.96	4.08	.....
28	14.00	6.00	3.44	.38	.86	2.80	3.60	.....
29	13.20	6.00	3.12	.38	.86	2.48	2.64	.....
30	11.76	6.80	2.80	.38	.95	2.48	2.96	.....
31	.....	6.80	.....	.38	.95	.....	2.48	.....
1913.								
1	.....	13.80	2.50	2.50	.12	.00	.03	.....
2	29.0	15.40	2.30	2.70	.20	.00	.03	.....
3	26.0	13.10	2.20	3.20	.02	.00	.04	.....
4	23.0	10.70	1.85	3.60	.01	.00	.07	.....
5	54.0	9.50	1.55	5.00	.15	.00	.10	.....
6	56.0	9.20	.60	3.60	.06	.00	.12	.....
7	51.0	8.30	.36	2.60	.10	.00	.36	.....
8	48.0	9.50	.32	1.75	.17	...	.55	.....
9	39.0	10.10	.24	1.45	.07	.00	.79	.....
10	34.0	10.70	.20	.86	.05	...	.86	.....
11	31.0	9.20	.17	.65	.03	.00	1.00	.....
12	46.0	7.60	.28	.50	.02	.00	1.09	.....
13	62.0	8.30	.17	1.55	.02	.00	1.18	.....
14	53.0	13.60	.28	3.10	.17	.00	1.00	.....
15	50.0	10.70	.20	2.20	.07	.00	.86	.....
16	45.0	9.90	.17	1.65	.05	.00	.86	.....
17	43.0	9.20	.15	1.36	.03	.00	.79	.....
18	38.0	8.30	.15	.79	.79	.00	.72	.....
19	28.0	8.30	.12	.50	3.00	.00	.65	.....
20	24.0	7.70	.28	.36	1.55	.00	.65	.....
21	21.0	7.40	1.75	.36	.93	.00	.79	.....
22	18.2	6.90	1.55	1.36	.50	.00	.72	.....
23	16.9	5.80	1.45	1.75	.28	.03	.65	.....
24	14.8	.93	1.36	1.36	.17	.02	.60	.....
25	12.9	3.00	3.00	1.09	.07	.02	.60	.....
26	11.9	2.60	9.70	.86	.02	.01	.55	.....
27	10.1	2.60	3.90	.65	.01	.01	.55	.....
28	9.9	2.50	4.00	.55	.01	.02	.45	.....
29	9.5	2.50	3.60	.40	.00	.03	.36	.....
30	5.8	3.20	2.90	.28	.00	.04	.32	.....
31	.....	2.60	.....	.17	.00	.....	.17	.....

a Interpolated.

Daily discharge, in second-feet, of Sixmile Creek at Spangler's ranch, Sask., 1911–1916—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1914.								
1			4.00	0.10	0.36			0.00
2			3.10	.14	.24			.00
3			3.60	.20	.12			.00
4			3.20	.20	.10			.00
5			3.00	.20	.10			.01
6			5.00	.40	.10			.04
7			3.20	.36	.10			.14
8			2.90	.36	.01			2.40
9			10.50	.28	.01			4.00
10			7.10	.20	.01			3.00
11		29.0	7.10	.18	.05			2.40
12		32.0	6.40	.24	.01			1.90
13		42.0	5.80	5.80	.00			1.40
14		43.0	5.20	8.40	.00			1.16
15		40.0	4.60	6.60	.00			.88
16		36.0	3.70	5.80	.00			.70
17		31.0	3.90	4.30	.00			.58
18		27.0	3.70	3.60	.00			.46
19		23.0	3.60	2.40	.00			.40
20		19.5	3.60	1.00	.00			.36
21		11.1	2.10	.88	.00			.32
22		11.1	2.10	.40	.00			.24
23		10.5	2.00	.12	.00			.20
24		8.6	2.50	.05	.00			.20
25		7.1	2.20	.07	.00			.18
26		6.8	1.80	1.60	.00			.14
27		6.1	.10	1.08	.00			.12
28		5.5	.08	.70	.00			.10
29		5.2	.08	.64	.00			.10
30		4.9	.10	.58	.00			.08
31			.07		.00			.07
1915.								
1		3.30	2.70	5.60	3.90	3.70	6.90	2.90
2		11.10	2.60	8.30	3.60	3.60	7.00	3.40
3		32.00	2.60	12.90	3.20	3.60	9.80	4.40
4		23.00	2.90	20.00	2.80	3.00	9.40	5.80
5		38.00	2.90	24.00	1.90	2.90	8.80	5.40
6		30.00	3.00	41.00	1.40	2.40	8.30	5.60
7		24.00	3.10	34.00	.90	2.20	8.00	5.80
8		17.70	2.90	24.00	5.20	1.90	3.40	5.60
9		13.30	1.66	18.00	4.60	1.40	3.40	5.40
10		12.00	1.10	12.80	4.10	.90	3.60	5.60
11		10.40	.70	11.10	3.60	.60	4.00	5.80
12		9.70	.56	9.90	2.20	.30	4.20	7.20
13		8.90	.56	8.80	3.60	.06	4.40	6.50
14		8.30	1.34	7.60	7.60	.15	5.00	5.60
15		7.90	8.90	6.80	8.20	.24	4.60	5.40
16	3.60	8.00	20.00	6.30	8.00	.30	4.00	5.00
17	3.20	8.60	17.60	6.60	9.40	.30	3.60	5.20
18	2.20	7.20	12.10	6.20	14.20	.24	3 40	5.00
19	1.82	6.80	10.10	5.90	15.30	.90	3.40	4.40
20	1.90	6.60	8.90	6.50	10.80	2.40	4.40	4.40
21	5.40	6.10	7.90	6.00	8.60	1.90	3.80	4.20
22	7.80	5.90	7.20	5.10	7.40	1.70	3.60	3.80
23	25.00	5.60	6.60	5.40	5.20	1.60	3.40	3.60
24	12.70	5.60	6.10	4.50	5.20	1.40	3.40	3.40
25	3.30	5.30	5.90	4.10	5.30	[a]1.20	3.20	3.80
26	10.50	5.00	6.10	4.30	5.90	[a]1.10	2.90	2.40
27	1.10	4.40	6.20	5.20	5.40	.90	2.90	4.00
28	.40	4.00	5.60	4.40	5.10	.60	2.80	3.40
29	1.20	3.60	5.90	4.20	4.60	6.40	2.80	3.40
30	2.30	3.30	6.00	4.10	4.20	6.60	2.90	3.10
31	2.40		5.40		3.80	6.90		2.90

[a] Interpolated.

Daily discharge, in second-feet, of Sixmile Creek at Spangler's ranch, Sask., 1911–1916—Continued.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1916.										
1	.....	[a]13.00	13.2	7.5	74.0	15.9	5.6	2.5	3.9	4.60
2	.....	12.60	12.0	7.8	53.0	14.5	5.2	2.3	4.2	5.00
3	.....	8.00	8.6	7.1	42.0	15.3	4.4	2.2	5.0	5.40
4	.....	4.20	9.0	7.5	34.0	17.3	4.0	4.0	5.4	5.80
5	.....	2.70	8.4	6.9	34.0	15.1	4.2	4.0	6.0	5.80
6	.....	2.90	7.8	6.5	48.0	13.2	4.0	4.0	4.6	5.00
7	.....	3.30	5.3	6.3	46.0	12.2	3.9	4.0	5.8	4.60
8	.....	.82	4.6	6.3	36.0	14.5	3.7	3.9	4.6	4.00
9	.....	6.30	6.9	6.1	28.0	20.0	5.2	3.9	11.6	3.70
10	.....	69.00	7.1	6.3	26.0	14.1	11.6	3.7	11.5	1.58
11	.....	122.00	7.3	6.3	42.0	11.1	7.8	3.7	10.7	1.01
12	.....	96.00	7.3	5.0	102.0	9.0	9.8	3.3	9.9	.....
13	.....	74.00	6.3	4.8	72.0	7.8	9.6	3.7	8.8	.....
14	.....	52.00	8.0	4.8	50.0	6.9	8.2	3.9	8.6	.....
15	.....	42.00	7.1	5.4	37.0	6.0	7.7	3.9	8.0	.....
16	167.0	46.00	6.9	5.6	33.0	5.8	7.3	3.7	7.7	.....
17	159.0	42.00	7.1	5.8	28.0	6.0	6.5	3.7	6.9	.....
18	149.0	35.00	8.0	5.8	25.0	7.3	7.8	3.3	6.1	.....
19	139.0	31.00	7.5	5.4	22.0	5.6	6.3	3.1	5.4	.....
20	129.0	39.00	7.8	4.8	18.9	5.8	5.6	3.1	4.8	.....
21	116.0	37.00	7.7	4.8	16.7	5.6	5.0	2.9	6.0	.....
22	92.0	27.00	7.1	4.6	16.9	5.4	4.4	2.9	6.7	.....
23	72.0	22.00	6.9	5.8	24.0	5.0	4.0	2.7	6.7	.....
24	60.0	13.00	6.5	6.7	24.0	4.4	3.9	2.7	6.5	.....
25	48.0	13.00	6.5	7.3	22.0	3.7	4.0	2.7	6.5	.....
26	40.0	12.00	6.0	8.2	18.9	8.8	4.0	2.7	6.3	.....
27	29.0	22.00	6.0	38.0	17.3	7.8	4.0	2.3	6.3	.....
28	17.9	17.50	6.0	46.0	14.9	7.7	3.5	3.9	6.0	.....
29	13.7	13.90	6.1	48.0	14.5	6.3	3.3	4.0	5.0	.....
30	.....	12.80	6.3	87.0	17.7	6.1	3.3	3.9	5.0	.....
31	.....	12.40	.....	98.0	.....	6.0	2.9	.....	5.0	.....

[a] Estimated.

NOTE.—1911: Creek frozen over Nov. 2, 3, and 8.
1913: Creek standing in pools Aug. 29 to Sept. 22.
1914: Ice present until Apr. 10. No flow July 13 to Oct. 4.
1915: Shifting control Mar. 23 to Apr. 17.
1916: Shifting control Feb. 16 to Apr. 19. Records discontinued Nov. 11; creek still running about 1 second-foot.

Monthly discharge of Sixmile Creek at Spangler's ranch, Sask., 1911–1916.

[Drainage area, 42 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1911.						
July 3–31	3.0	0.2	0.8	0.018	0.019	44
August	4.4	.2	1.2	.027	.031	74
September	94.0	.2	21.8	.495	.552	1,297
October	9.3	2.0	5.6	.127	.146	344
November 1 and 4–7	4.5	3.1	3.8	.086	.016	38
The period	.....	.....	.....	.....	.764	1,797
1912.						
April 14–30	38.10	11.76	27.03	.614	.39	911
May	18.80	3.44	7.70	.175	.21	473
June	13.96	1.88	6.02	.137	.15	358
July	4.52	.98	2.56	.058	.07	157
August	1.30	.38	.80	.018	.02	49
September	3.60	.95	1.82	.042	.05	108
October	6.00	1.84	3.49	.079	.09	215
November 1–15	3.44	1.58	2.41	.055	.03	72
The period	.....	.....	.....	.....	1.01	2,343

Monthly discharge of Sixmile Creek at Spangler's ranch, Sask., 1911–1916—Contd.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1913.						
April 2–30	62.00	0.580	31.400	0.714	0.770	1,806
May	15.40	.93	7.840	.178	.205	482
June	4.00	.12	1.580	.036	.040	94
July	5.00	.17	1.570	.036	.040	96
August	3.00	.00	.280	.006	.007	17
September	.04	.00	.006	.000	.000	0
October	1.18	.03	.565	.013	.013	34
The period					1.077	2,529
1914.						
April 11–30	43.00	4.90	20.00	.47600	.350	791.0
May	10.50	.07	3.40	.08140	.094	209.0
June	8.40	.05	1.57	.03730	.042	93.0
July	.36	.00	.04	.00095	.001	2.5
October	4.00	.00	.71	.01700	.020	44.0
The period					.510	1,140.0
1915.						
March 16–31	25.0	.40	5.3	.1260	.07	169
April	38.0	3.30	22.0	.5240	.58	1,309
May	20.0	.56	5.6	.1330	.15	344
June	41.0	4.10	10.8	.2570	.29	643
July	15.3	.90	5.6	.1330	.15	344
August	6.9	.06	2.0	.0476	.05	123
September	9.8	2.80	4.7	.1120	.12	280
October	7.2	2.90	4.7	.1120	.13	289
The period					1.54	3,501
1916.						
February 16–29	167.0	13.70	88.0	2.100	1.09	2,443
March	122.0	.82	29.0	.690	.80	1,783
April	13.2	4.60	7.4	.176	.20	440
May	98.0	4.60	15.4	.367	.42	947
June	102.0	14.50	35.0	.833	.93	2,083
July	20.0	3.70	9.4	.224	.26	578
August	11.6	2.90	5.5	.131	.15	338
September	4.0	2.20	3.4	.081	.09	202
October	11.6	3.90	6.6	.157	.18	406
November 1–11	5.8	1.01	4.2	.100	.04	92
The period					4.16	9,312

NOTES.—1911: Creek frozen on Nov. 2–3. For total run-off of creek add run-off at Soderstroms. Some water diverted above by Spangler.
1912: Includes water diverted by Spangler.
1913: No flow Aug. 29 to Sept. 22.
1914: Ice present Mar. 15 to Apr. 10.

Mean monthly discharge, in second-feet, of Sixmile Creek at Spangler's ranch, Sask., 1909–1916.

Year.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total in acre-feet.
1909	.....	.....	.....	.....	.....	[a]10.70	3.80	0.65	0.95	[a] 1.20	[a] 568
1910	.....	.....	6.8	3.0	0.92	.24	.18	.48	.61	.....	736
1911	.....	.....	13.2	7.6	[a] 6.40	[b].80	1.20	21.80	5.60	[a] 3.80	3,182
1912	.....	.....	[a] 27.0	7.7	6.00	2.60	.80	1.82	3.50	2.40	2,414
1913	.....	.....	[b] 31.0	7.8	1.58	1.57	.28	.01	.56	.....	2,568
1914	.....	.....	[a] 20.0	3.4	1.57	.04	0	0	.71	.....	1,140
1915	.....	[a] 5.3	22.0	5.6	10.80	5.60	2.00	4.70	4.70	.....	3,501
1916	[a] 88	29.0	7.4	15.4	35.00	9.40	5.50	3.40	6.60	[c] 2.10	9,345
Average	.....	6	16.1	7.3	9.3	2.9	1.72	4.1	2.9	2.2	3,269
Average run-off, acre-feet	.....	369	958	443	553	178	106	244	178	131	3,160
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	75

[a] Incomplete record not included in average.
[b] Average for part of month assumed as monthly average.
[c] Estimated.

NOTE.—March, 1916, averaged for five years as abnormal conditions. From 1909 to June 30, 1911, station maintained at 26–7–28–3 (drainage area, 27 square miles). From July 1, 1911, station maintained at 29–7–28–3 (drainage area, 42 square miles).

TENMILE CREEK NEAR TENMILE POLICE DETACHMENT, SASK.

LOCATION.—In SE. ¼ sec. 4, T. 6, R. 29 W. third meridian, about 600 feet upstream from junction with Battle Creek, 1,000 feet from Police Detachment.

DRAINAGE AREA.—24 square miles.

RECORDS AVAILABLE.—Open-water flow July 21, 1909, to April 30, 1915, when station was discontinued.

GAGE.—Vertical staff; read by W. H. Tudgay.

DISCHARGE MEASUREMENTS.—Made by wading or, at very low stages, by weir.

CHANNEL AND CONTROL.—Bed gravel; one channel. Banks high, grassy, not subject to overflow. Control affected by beaver dams.

EXTREMES OF STAGE.—1909–1915: Maximum stage recorded, 4.32 feet March 22, 1915 (discharge, 96 second-feet); minimum stage recorded, 0.58 foot (no discharge) August 15 to 22, 1911.

ICE.—Observations discontinued during winter.

ACCURACY.—Stage-discharge relation fairly constant, but affected by ice during periods of spring break-up and is likely to change owing to back water from beaver dams. Gage read once daily to hundredths during open-water periods. Records fair.

Discharge measurements of Tenmile Creek at Tenmile Police Detachment, Sask., 1909–1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1909.		*Feet.*	*Sec.-ft.*	1913.		*Feet.*	*Sec.-ft.*
May 28	H. R. Carscallen	.....	0.79	Apr. 18	H. D. St. A. Smith	4.05	2.96
June 16	do	.....	.41	June 4	do	3.84	[b].43
July 1	do	.....	.82	13	H. O. Brown	3.79	.52
21	do	0.82	.35	26	H. D. St. A. Smith	3.75	.32
Aug. 9	do	.78	.30	July 23	do	3.75	.57
Sept. 8	do	.82	.19	Aug. 15	do	3.75	.24
29	do	.78	.25	Sept. 13	do	3.68	[b].18
Nov. 4	do	.79	.26	Oct. 28	do	3.74	[b].24
1910.				1914.			
Apr. 22	H. R. Carscallen	.94	.41	Apr. 25	H. R. Carscallen	1.80	[b].88
May 16	do	.90	.34	27	H. W. Rowley	1.77	[b].79
June 10	do	.87	.20	May 4	do	1.65	.31
July 2	do	.84	.21	28	do	1.62	[b].27
25	do	.96	.18	June 5	do	1.62	[b].25
Aug. 13	do	1.10	.26	22	do	1.60	[b].32
Sept. 5	do	1.31	.24	July 9	do	1.58	[b].16
28	R. G. Swan	1.71	.15	Aug. 1	do	1.58	[b].17
Oct. 25	do	1.76	.20	6	do	1.57	[b].13
1911.				Sept. 2	do	1.67	[b].15
Apr. 22	M. H. French	1.90	.260	14	do	1.98	[b].23
May 18	do	.62	.444	15[c]	do	[a].59	[b].12
June 10	do	.59	.270	Oct. 5[c]	do	[a].60	[b].15
July 5	do	.63	.296	23[c]	do	[a].59	[b].10
Sept. 2	do	.69	.224	Nov. 2[c]	do	[a].59	[b].11
15	do	.76	[a].423	1915.			
30	do	.98	[a].400	Mar. 25	H. R. Carscallen	2.34	18.20
1912.				30	do	1.86	3.90
Apr. 27	M. H. French	.94	1.83	Apr. 3	do	2.85	37.00
June 1	G. R. Eliott	.74	.36	10	do	1.63	.80
18	O. H. Hoover	.75	.32	13	H. W. Rowley	1.58	.15
July 6	G. R. Elliott	.70	.24				
17	O. H. Hoover	.73	.27				
18	do	.73	.26				
Sept. 7	G. R. Elliott	.70	.22				
Nov. 13	do	.98	[a].25				

[a] Gage height raised by beavers.
[b] Weir measurement.
[c] Measurements made at upper station.

Daily discharge, in second-feet, of Tenmile Creek at Tenmile Police Detachment, Sask., 1909–1915.

Day.	July.	Aug.	Sept.	Oct.	Day.	July.	Aug.	Sept.	Oct.
1909.					1909.				
1	.....	0.274	0.274	0.274	16	.....	0.274	0.274	0.274
2	.....	.274	.274	.274	17	.....	.274	.274	.274
3	.....	.274	.274	.274	18	.....	.274	.274	.274
4	.....	.274	.274	.274	19	.....	.274	.274	.274
5	.....	.274	.274	.274	20	.....	.274	.274	.274
6	.....	.274	.274	.274	21	0.274	.274	.274	.274
7	.....	.274	.274	.274	22	.274	.274	.274	.274
8	.....	.274	.274	.274	23	.274	.274	.274	.274
9	.....	.274	.274	.274	24	.274	.274	.274	.274
10	.....	.274	.274	.274	25	.274	.274	.274	.274
11	.....	.274	.274	.274	26	.274	.274	.274	.274
12	.....	.274	.274	.274	27	.274	.274	.274	.274
13	.....	.274	.274	.274	28	.274	.274	.274	.274
14	.....	.274	.274	.274	29	.274	.274	.274	.274
15	.....	.274	.274	.274	30	.274	.274	.274	.274
					31	.274	.274	.....	.274

Day.	May.	June.	July.	Aug.	Sept.	Day.	May.	June.	July.	Aug.	Sept.
1911.						1911.					
1	.....	0.4	0.3	0.1	0.3	16	.....	0.2	0.2	0	0.1
2	.....	.4	.4	.1	.3	17	.....	.2	.2	0	.1
3	.....	.4	.3	.1	.3	18	0.6	.1	.1	0	.1
4	.....	.4	.3	.1	1.6	19	.4	.2	.1	0	0
5	.....	.5	.4	.1	2.6	20	.4	.2	.1	0	.....
6	.....	.5	.3	1.4	26.0	21	.3	.2	.1	0	.....
7	.....	.5	.2	.2	19.0	22	.3	.3	.1	0	.1
8	.....	.4	.2	.3	17.0	23	1.0	.2	.1	.2	.9
9	.....	.4	.2	.2	12.0	24	.6	.2	.1	.2	1.1
10	.....	.2	.3	.1	5.4	25	.4	.2	.1	.1	1.3
11	.....	.2	.3	.1	2.5	26	.6	.3	.1	.1	1.2
12	.....	.2	.2	.1	1.4	27	.7	.2	.1	.2	.8
13	.....	.2	.3	.1	1.1	28	.4	.2	.1	.2	.7
14	.....	.2	.3	.1	.7	29	.4	.1	.1	.2	.4
15	.....	.2	.2	0	.4	30	.4	.2	.1	.3	.4
						31	.5	.....	.1	.3	.....

Daily discharge, in second-feet, of Tenmile Creek at Tenmile Police Detachment, Sask., 1909–1915—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1912.								
1	.....	1.96	0.30	0.28	a 0.22	0.21	0.23	0.26
1	.....	1.96	.30	.28	a. 22	.21	.23	.26
3	.....	.99	.30	.28	.22	.21	.23	.26
4	.....	.70	.30	.30	.22	.21	.23	.26
5	.....	.90	.30	.28	.22	.22	.23	.26
6	.....	1.36	.30	.22	a. 22	.22	.23	.26
7	.....	1.17	.30	.22	.21	.22	.23	.26
8	.....	.99	.30	a. 22	.21	.22	.23	.26
9	.....	.90	.30	a. 22	.21	.22	.23	.26
10	.....	.56	.30	a. 22	a. 21	.22	.23	.26
11	.....	.42	.30	.22	.20	.22	.24	.26
12	.....	.37	.30	.22	.20	.22	.24	.26
13	9.52	.32	.30	.22	a. 21	a. 22	.24	.26
14	8.76	.32	.30	.26	.22	.22	.24	.26
15	7.63	.32	.70	.24	.21	.22	.24	.26
16	5.74	.32	.37	.22	.21	.22	.24	.....
17	5.74	.30	.32	.28	.21	.22	.24	.....
18	4.48	.30	.30	.28	.21	.22	.24	.....
19	4.23	.30	.30	.22	a. 22	.22	.24	.....
20	3.85	.32	.30	.20	.22	.22	.24	.....
21	12.67	.32	.30	.20	.22	.22	.25	.....
22	12.67	.32	.28	a. 20	.22	.22	.25	.....
23	2.59	.32	.28	.20	.21	.22	.25	.....
24	a 2.34	.32	.28	.19	a. 21	.22	.25	.....
25	1.96	.30	.28	a. 19	a. 21	.22	.25	.....
26	1.96	.30	.28	.19	.21	.22	.25	.....
27	1.96	.99	.28	.20	.22	.22	.25	.....
28	2.09	3.85	.30	.19	.24	.22	.25	.....
29	a 1.96	1.96	a. 30	.20	.22	.22	.25	.....
30	1.96	.56	a. 28	.22	.22	.22	.25	.....
31	.....	.32	.....	a. 22	.21	.....	.25	.....

a Interpolated.

Daily discharge, in second-feet, of Tenmile Creek at Tenmile Police Detachment, Sask., 1909–1915—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1913.								
1	.....	3.40	0.95	0.95	a 0.32	0.32	0.24	0.23
2	.....	3.50	.95	.88	.37	.32	.24	.23
3	.....	2.40	.88	.88	.58	.30	.24	.23
4	.....	3.00	.88	.88	.95	.30	.24	.23
5	.....	4.50	1.04	.80	.58	.37	.24	.24
6	.....	12.40	1.33	.73	.37	.32	.24	.24
7	.....	16.70	1.14	.58	.32	.32	.23	.24
8	.....	a13.20	1.23	a.58	.32	.32	.23	.24
9	.....	9.60	.88	.58	a.58	.32	.23	.24
10	.....	8.90	.88	.58	.95	a.32	.22	.23
11	.....	9.60	.88	a.58	1.04	.30	.22	.23
12	.....	8.60	.80	.58	.95	.30	.21	.23
13	.....	11.90	.58	.53	.88	.30	.21	.23
14	.....	9.90	.95	.48	.58	.30	.21	.23
15	.....	a 7.90	.95	a.42	.48	.32	.21	.23
16	.....	a 6.10	.80	.37	.32	.23	.21	.23
17	.....	5.00	.95	.32	.32	a.23	.21	.23
18	.....	3.00	.88	.32	.30	.24	.23	.23
19	.....	a 2.80	.95	.37	.30	a.24	.22	.23
20	.....	2.70	.95	.48	.27	.24	.22	.23
21	.....	2.40	.95	.37	a.48	.23	.22	.23
22	.....	a 1.62	.95	.32	.80	.23	.24	.23
23	.....	.95	.95	.32	.58	.23	.24	.23
24	.....	.88	.95	.32	.32	a.23	.24	.23
25	.....	1.62	a.95	.32	.32	.23	.24	.23
26	.....	1.42	.95	.65	.32	.23	.23	.23
27	.....	1.33	.95	.53	.32	.23	.23	.23
28	.....	1.23	a.95	.73	a.32	.23	.23	.23
29	.....	a 1.14	a.95	.48	.32	.23	.23	.23
30	.....	1.04	.95	.32	.32	.23	.23	.23
31	.....	.....	.95	.....	.32	.24	.....	.23
1914.								
1	.....	.25	.47	.28	.20	.11	.16	.17
2	.....	.20	.43	.28	.18	.16	.16	.17
3	.....	.18	.40	.28	.18	.18	.16	.23
4	.....	.25	.40	.23	.20	.11	.16	.23
5	.....	3.80	.47	.23	.18	18	.16	.14
6	.....	3.50	.40	.54	.18	.13	.16	.17
7	.....	2.90	.40	.25	.13	.13	.16	.20
8	.....	3.00	.40	.20	.11	.14	.16	.20
9	.....	3.20	.47	.18	.18	.14	.16	.17
10	.....	2.00	.47	.20	.18	.14	.16	.17
11	.....	2.80	.57	.20	.18	.14	.16	.14
12	.....	2.70	.43	.23	.16	.14	.17	.14
13	.....	5.50	.40	.20	.16	.14	.21	.14
14	.....	6.70	.43	.25	.11	14	.14	.14
15	.....	6.10	.40	.25	.18	.14	.11	.11
16	1.44	4.50	.47	.23	.20	.14	.11	.11
17	.25	3.20	.47	.23	.13	.14	.11	.11
18	.25	2.30	50	.16	.08	.15	.11	.11
19	.25	1.80	.50	.16	.18	.15	.17	.11
20	.07	1.72	.40	.16	.13	.16	.20	.11
21	.07	1.34	.40	.16	.13	.15	.20	.14
22	.07	.95	.47	.18	.11	.15	.20	.11
23	.07	.81	.40	.18	.11	.15	.20	.11
24	.09	.77	.40	.16	.16	.15	.20	.11
25	.09	.90	.36	.20	.09	.15	.17	.11
26	.09	.81	.36	.18	.11	.16	.17	.11
27	.09	.77	.28	.18	.11	.16	.17	.11
28	.16	.28	.25	.20	.13	.16	.17	.11
29	.16	.68	.23	.25	.11	.16	.17	.11
30	.13	.54	.23	.23	.16	.16	.17	.11
31	.54	.....	.25	.....	.11	.16	.....	.11

a Interpolated.

Daily discharge, in second-feet, of Tenmile Creek at Tenmile Police Detachment, Sask., 1909–1915—Continued.

Day.	Mar.	Apr.	Day.	Mar.	Apr.	Day.	Mar.	Apr.
1915.			1915.			1915.		
1		3.30	11		0.40	21		0.32
2		14.90	12		.51	22	96.00	.32
3		35.00	13		.36	23	71.00	.32
4		50.00	14		.36	24	26.00	.32
5		53.00	15		.32	25	18.90	.32
6		14.20	16		.32	26	11.40	.32
7		4.00	17		.32	27	9.20	.32
8		2.20	18		.32	28	7.60	.32
9		1.17	19		.32	29	6.30	.32
10		.51	20		.32	30	4.30	.32
						31	2.20	

NOTE.—1911: Shifting-control method used to determine discharge June 10 to Sept. 30 because of beaver dams below. No flow Aug. 15–22 and Sept. 19–21. Creek would be dry all summer but for springs just above station.
1912: Stage gradually raised by beaver dam Sept. 17 to Nov. 15.

Monthly discharge of Tenmile Creek at Tenmile Police Detachment, Sask., 1909–1915.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1909.						
July 21–31	0.274	0.274	0.274	0.0105	0.004	6
August	.274	.274	.274	.0105	.012	17
September	.274	.274	.274	.0105	.012	16
October	.274	.274	.274	.0105	.012	17
The period						56
1911.						
May 18–31	1.0	.3	.58	.021	.011	14
June	.5	.1	.27	.011	.012	16
July	.4	.1	.19	.008	.009	12
August	1.4	.0	.16	.007	.008	10
September	26.0	.0	3.26	.136	.152	194
The period					.192	246
1912.						
April 13–30	12.67	1.96	5.11	.213	.14	182
May	1.96	.30	.78	.032	.04	48
June	.70	.28	.31	.013	.01	18
July	.30	.19	.23	.010	.01	14
August	.24	.20	.21	.009	.01	13
September	.22	.21	.22	.009	.01	13
October	.25	.23	.24	.010	.01	15
November 1–15	.26	.26	.26	.011	.006	8
The period					.24	311
1913.						
April	16.70	.88	5.290	.220	.24	315
May	1.33	.58	.945	.039	.04	58
June	.95	.32	.542	.022	.02	32
July	1.04	.27	.490	.020	.02	30
August	.37	.23	.272	.011	.01	17
September	.24	.21	.227	.009	.01	14
October	.24	.23	.232	.010	.01	14
The period					.35	480
1914.						
March 16–31	1.44	.7	.24	.0100	.006	7.6
April	6.70	.18	2.00	.0890	.099	127.0
May	.57	.23	.40	.0170	.020	24.8
June	.54	.16	.22	.0093	.010	13.3
July	.20	.08	.15	.0062	.007	9.1
August	.18	.11	.15	.0062	.007	9.1
September	.21	.11	.16	.0068	.008	9.7
October	.23	.11	.14	.0058	.007	8.6
The period					.164	209.0
1915.						
March 22–31	96.0	2.20	25.0	1.042	.39	500.0
April	53.0	.32	6.2	.258	.29	369.0
The period					.68	869.0

NOTE.—1911: Run-off during October about 0.3 second-foot, or 18 acre-feet.

Mean monthly discharge, in second-feet, of Tenmile Creek near Tenmile Police Detachment, Sask., 1911–1915.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total in acre-feet.
1911	.....	.....	[a] 0.58	0.27	0.19	0.16	3.30	[b] 0.30	.....	[a] 264
1912	.....	[a] 5.1	.78	.31	.23	.21	.22	.24	[a] 0.26	311
1913	.....	5.3	.94	.54	.49	.27	.23	.23	.....	480
1914	[a] 0.24	2.0	.40	.22	.15	.15	.16	.14	.....	209
1915	[a] 25.00	6.2	.....	.....	.....	.....	.....	.....	.....	[a] 869
Average	.....	4.5	.71	.34	.26	.20	.98	.23	.....	333
Average run-off, acre-feet	.....	268	44	20	16	12	58	14	.....	432
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	18

[a] Incomplete record not included in average. [b] Estimated.

FRENCHMAN RIVER NEAR BELANGER, SASK.

LOCATION.—In SE. ¼ sec. 19, T. 6, R. 25 W. third meridian, three-quarters of a mile downstream from the point where the road from Maple Creek to Kelvinhurst crosses the river, 38 miles south of Maple Creek. New station established October 9, 1917, in SW. ¼ sec. 28, T. 6, R. 25 W. third meridian, about one-quarter mile above mouth of Davis Creek, and 8½ miles northwest of Robsart.

DRAINAGE AREA.—174 square miles.

RECORDS AVAILABLE.—Open-water flow June 12, 1916, to October 31, 1917.

GAGE.—Vertical staff on left bank; read by J. D. Gilchrist. At new station a Stevens continuous water-stage recorder, 30 feet above gaging section and 30 feet back from left bank of the river at low water; vertical staff in well and vertical staff in stream at outer end of intake box.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and clay; affected by backwater from Belanger Creek during flood stages; bank low, subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 4.01 feet, April 19, 1917 (discharge, estimated as 400 second-feet); 3.89 feet (discharge, measured at 247 second-feet), May 3, 1917; minimum stage recorded, 0.76 foot, September 24, 1916 (discharge, 2.9 second-feet).

ICE.—Observations discontinued in winter season.

ACCURACY.—Stage-discharge relation permanent during ordinary stages. Gage read to hundredths daily. Daily discharge obtained by applying daily gage heights to rating table. Records poor.

Discharge measurements of Frenchman River near Belanger, Sask., 1916–17.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1916.		*Feet.*	*Sec.-ft.*	1917.		*Feet.*	*Sec.-ft.*
May 11	J. E. Caughey	[a]	10.2	May 3	H. W. Rowley	3.89	247.0
June 10	do	[a]	12.5	29	do	5.82	[d] 93.0
July 12	do	1.27	8.0	July 7	do	1.23	17.2
Sept. 2	L. B. P. Miles	.85	3.5	7	do	4.30	[d] 30.0
Oct. 24	do	.48	4.7	24	do	3.60	[d] 10.6
				Nov. 13	do	3.42	[d] 14.6
1917.				16	do	.17	5.1
Apr. 14	H. W. Rowley	4.39	[b]				
19	do	4.01	[c] 400.0				

[a] No gage.
[b] Unable to make measurement owing to backwater and flooding from Belanger Creek.
[c] Estimated.
[d] Taken on SW. ¼ sec. 28, T. 6, R. 25 W. third meridian.

Daily discharge, in second-feet, of Frenchman River near Belanger, Sask., 1916–17.

Day.	June.	July.	Aug.	Sept.	Oct.	Day.	June.	July.	Aug.	Sept.	Oct.
1916.						1917.					
1	.....	22.0	7.7	4.5	7.8	1	.....	8.4	7.5	5.4	5.2
2	.....	21.0	7.1	3.6	8.2	2	.....	8.4	7.4	5.4	5.2
3	.....	20.0	7.1	3.6	8.5	3	.....	9.6	7.3	5.4	5.2
4	.....	20.0	6.9	3.7	7.8	4	.....	15.0	7.3	5.4	5.2
5	.....	18.9	6.9	3.7	7.3	5	56.0	9.6	7.2	5.4	5.2
6	.....	18.6	6.7	3.9	7.8	6	55.0	9.6	7.2	5.4	5.2
7	.....	16.9	6.7	4.0	8.3	7	53.0	17.4	7.0	5.4	5.2
8	.....	13.5	7.0	4.3	8.3	8	47.0	15.8	7.0	5.4	5.2
9	.....	12.7	7.6	4.5	8.0	9	42.0	12.8	7.0	5.4	5.2
10	.....	12.0	7.5	4.0	7.7	10	28.0	12.0	6.9	5.4	5.2
11	.....	9.2	7.1	3.6	7.2	11	29.0	11.6	6.9	5.4	5.2
12	59	7.9	7.0	3.5	6.9	12	28.0	11.2	6.8	5.4	5.2
13	60	7.8	6.7	3.5	6.6	13	26.0	11.1	6.8	5.4	5.2
14	46	7.8	6.6	3.4	6.4	14	26.0	10.8	6.8	5.3	5.2
15	44	7.8	6.6	3.4	6.2	15	25.0	11.0	6.7	5.3	5.2
16	44	7.7	[a] 6.6	3.4	6.0	16	23.0	11.1	6.7	5.3	5.2
17	41	7.7	6.6	3.2	6.0	17	21.0	10.0	6.6	5.3	5.2
18	39	19.1	6.5	3.2	5.6	18	17.7	10.0	6.6	5.3	5.2
19	37	21.0	6.5	3.1	5.2	19	15.0	10.0	6.5	5.3	5.2
20	26	19.1	6.5	3.0	5.2	20	16.2	10.0	6.5	5.2	5.2
21	23	14.0	6.4	3.0	5.0	21	15.0	9.9	6.2	5.2	5.2
22	26	14.0	6.3	3.0	4.8	22	12.8	9.8	6.1	5.1	5.2
23	28	9.6	6.3	3.0	4.6	23	12.8	9.6	6.0	5.2	5.2
24	24	9.6	6.2	2.9	4.6	24	12.4	9.6	5.7	5.2	5.2
25	23	8.3	6.1	3.2	4.6	25	11.8	9.6	5.5	5.2	5.2
26	23	8.3	6.0	7.3	4.6	26	11.1	8.2	5.5	5.2	5.2
27	23	8.3	6.0	7.7	4.5	27	10.8	8.2	5.5	5.2	5.2
28	22	10.3	5.9	7.7	4.5	28	10.5	8.2	5.4	5.2	5.2
29	22	8.9	5.9	7.6	4.5	29	10.4	8.2	5.4	5.2	5.2
30	22	8.3	5.8	7.1	4.5	30	10.2	8.1	5.4	5.2	5.2
31	.....	7.7	5.8	.....	4.5	31	.....	8.1	5.4	.....	5.2

[a] Discharge estimated.

NOTE.—1917: Unable to obtain observer until June 5. Observations reported July 17–31 apparently erroneous; revised in office.

Monthly discharge of Frenchman River near Belanger, Sask., 1916–17.

[Drainage area, 174 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1916.						
June 12–30	60.0	22.0	33.0	0.190	0.13	1,243
July	22.0	7.7	12.8	.074	.09	787
August	7.7	5.8	6.6	.038	.04	406
September	7.7	2.9	4.2	.024	.03	250
October	8.5	4.5	6.2	.036	.04	381
The period	.....	.....	.....	.....	.33	3,067
1917.						
June 5–30	56.0	10.2	24.0	.138	.13	1,238
July	17.4	8.1	10.4	.060	.07	640
August	7.5	5.4	6.5	.037	.04	400
September	5.4	5.1	5.3	.030	.03	315
October	5.2	5.2	5.2	.030	.04	320
The period	.....	.....	.....	.....	.31	2,913

FRENCHMAN RIVER AT GORDON'S RANCH, SASK.

LOCATION.—In the NW. ¼ sec. 16, T. 6, R. 24 W. third meridian, at R. N. S. Gordon's ranch near Ravenscrag, Sask.

DRAINAGE AREA.—430 square miles.

RECORDS AVAILABLE.—Open-water flow, incomplete records, May 17, 1913, to May 31, 1914, when station was discontinued.

GAGE.—Chain gage.

DISCHARGE MEASUREMENTS.—Made by wading or from cable.

CHANNEL AND CONTROL.—Bed clay and gravel and not likely to shift. Banks slightly wooded, high, and not subject to overflow except in extreme flood stages. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 8.51 feet, April 6, 1914 (discharge, 720 second-feet); minimum stage recorded, 2.10 feet, September 4, 1913 (discharge, 1.10 second-feet).

ICE.—Station not maintained during winter.

ACCURACY.—Repeated omission of gage readings during 1914, prevents computation of monthly discharge. Gage height observation after May 31 of no value on account of beaver dam below station. Records poor.

Discharge measurements of Frenchman River at Gordon's ranch, Sask., 1912–1914.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1912.		*Feet.*	*Sec.-ft.*	1914.		*Feet.*	*Sec.-ft.*
June 11	J. S. Wright	2.19	20.90	Mar. 17	M. H. French	6.01	[a]214.00
July 12	do	2.18	20.68	23	do	3.33	[a]21.00
Aug. 17	do	1.95	11.43	Apr. 9	do	4.56	[a]247.00
Sept. 9	do	2.22	6.63	21	do	2.63	58.00
Oct. 12	do	1.23	7.95	May 8	F. R. Steinberger	2.33	44.00
Nov. 12	do	1.42	14.34	26	do	2.00	19.90
				June 27	do	1.89	12.80
1913.				July 2	do	2.02	[b]4.08
Apr. 17	J. S. Wright	4.67	225.0	Aug. 8	do	2.27	[b]1.69
May 17	E. W. W. Hughes	2.69	55.0	29	E. W. W. Hughes	2.44	[b].51
June 20	do	2.89	63.0				
July 19	do	2.09	13.2				
Sept. 3	do	2.30	3.8				
29	do	2.31	6.3				
Oct. 18	do	2.32	4.5				
Nov. 11	do	2.30	3.7				

[a] Ice present. [b] Gage height affected by beaver dam.

Daily discharge, in second-feet, of Frenchman River at Gordon's ranch, Sask., 1913–14.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1913.							1913.						
1	.....	16.4	16.4	4.2	3.70	[a]11.20	16	.....	5.6	22.0	11.6	2.30	5.40
2	.....	14.6	21.0	6.2	2.10	[a]10.60	17	51.0	12.8	20.0	11.6	2.40	4.10
3	.....	14.0	21.0	9.5	1.10	10.40	18	43.0	31.0	18.2	12.2	2.40	4.00
4	.....	13.4	33.0	11.0	1.10	9.90	19	39.0	32.0	14.6	11.0	2.60	3.90
5	.....	13.4	24.0	9.5	1.12	9.00	20	37.0	61.0	12.8	10.5	2.70	3.90
6	.....	13.4	22.0	10.5	1.15	10.00	21	35.0	32.0	11.6	11.0	2.80	[a]3.80
7	.....	12.8	20.0	12.8	1.18	9.80	22	33.0	22.0	11.0	10.0	5.30	[a]4.00
8	.....	10.5	18.2	14.6	1.20	9.60	23	32.0	18.8	9.5	9.5	11.30	[a]4.00
9	.....	8.5	21.0	12.8	1.43	10.00	24	28.0	15.2	8.5	8.5	13.60	[a]4.00
10	.....	7.7	24.0	11.6	1.85	10.90	25	27.0	16.4	7.7	8.5	15.60	[a]4.30
11	.....	7.7	21.0	10.5	1.90	11.90	26	25.0	38.0	6.9	7.7	15.90	4.30
12	.....	8.5	21.0	9.5	2.40	12.70	27	24.0	44.0	6.2	7.7	14.90	4.60
13	.....	12.8	28.0	9.5	2.50	12.60	28	22.0	22.0	5.6	9.5	12.60	4.90
14	.....	14.0	25.0	14.0	2.40	10.10	29	21.0	15.8	5.0	8.4	12.80	4.90
15	.....	6.9	22.0	11.6	2.30	8.00	30	19.4	13.4	4.6	7.0	[a]12.10	5.50
							31	18.2	.....	4.4	6.0	.....	6.20

[a] Interpolated.

Daily discharge, in second-feet, of Frenchman River, at Gordon's ranch, Sask., 1913–14.

Day.	Mar.	Apr.	May.	Day.	Mar.	Apr.	May.	Day.	Mar.	Apr.	May.
1914.				1914.				1914.			
1	.....	.....	39	11	.....	145	52	21	.....	61	27
2	.....	.....	37	12	.....	349	45	22	.....	53	.....
3	.....	.....	.....	13	.....	.....	34	23	21	51	.....
4	.....	.....	.....	14	98	389	34	24	.....	50	.....
5	.....	.....	.....	15	551	313	36	25	.....	50	.....
6	.....	720	.....	16	421	.....	32	26	.....	57	19
7	.....	601	.....	17	214	.....	31	27	.....	50	.....
8	.....	.....	39	18	286	105	27	28	.....	49	.....
9	.....	247	.....	19	260	78	30	29	.....	49	.....
10	.....	156	57	20	.....	65	27	30	.....	42	....
								31	.....	.....	.....

NOTE.—1913: No observations previous to May 17.
1914: Observations of gage height periodically taken after May 31 of no value on account of beaver dam below the station.

Monthly discharge of Frenchman River at Gordon's ranch, Sask., 1913–14.

[Drainage area, 430 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1913.						
May 17–31	51.0	18.20	30.30	0.070	0.039	902
June	61.0	6.90	18.50	.043	.048	1,100
July	33.0	4.40	16.30	.038	.044	1,002
August	14.6	4.20	10.00	.023	.026	612
September	15.9	1.10	5.22	.012	.013	311
October	12.7	3.80	7.37	.017	.020	453
The period	.....	.....	.....	.....	.190	4,380
1914.						
March	551	21	264	.....	.....	.....
April	720	42	175	.....	.....	.....
May	57	19	35	.....	.....	.....
The period	.....	.....	.....	.....	.....	.....

FRENCHMAN RIVER AT PHILLIPS'S RANCH, SASK.

LOCATION.—In the NE. ¼ sec. 23, T. 6, R. 23 W. third meridian, about 10 miles above Eastend.

DRAINAGE AREA.—589 square miles.

RECORDS AVAILABLE.—Open-water period; incomplete records for 1912; complete records for 1913–1917. For incomplete records for 1909–10 and complete records for 1911–12, see records for "Frenchman River at Enright and Strong's ranch" at Eastend, 10 miles below this station. No tributaries enter between these two stations.

GAGE.—Vertical staff; read by A. T. Phillips. On August 24, 1917, because of diversion of channel by Canadian Pacific Railway Co., a temporary staff was placed in the new diversion channel about 400 feet north of site of old gage.

DISCHARGE MEASUREMENTS.—Made from a cable 900 feet below gage during flood stages and at gage during low stages by wading.

CHANNEL AND CONTROL.—Bed of channel clay and gravel; fairly permanent. Banks covered with brush, subject to overflow in flood stages. An artificial control that was placed in the channel in October, 1914, was damaged during the spring flood of 1916 and repaired in October of the same year, but was totally destroyed in spring flood of 1917.

EXTREMES OF STAGE.—1912–1917: Maximum stage recorded, 8.74 feet April 22, 1917 (discharge, 4,041 second-feet); minimum stage recorded, 0.89 foot August 6, 1914 (discharge, 1.50 second-feet).

ICE.—Observations discontinued during winter months, although there is a small flow under the ice. Stage-discharge relation affected by ice during spring break-up.

DIVERSIONS.—Several small irrigation projects divert water from this stream and its tributaries above this station.

ACCURACY.—Stage-discharge relation fairly permanent from 1912 to 1914 when artificial control was constructed which gave permanent stage-discharge relation until washed out in spring flood of 1917. Rating curves are fairly well defined. Record considered fair.

Discharge measurements of Frenchman River at Phillips's ranch, Sask., 1912–1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1912.		*Feet.*	*Sec.-ft.*	1915.		*Feet.*	*Sec.-ft.*
June 11	J. S. Wright	1.64	43.89	Aug. 5	J. E. Caughey	1.61	35.0
July 9	do	1.48	26.79	25	do	1.43	21.0
Aug. 6	do	1.33	19.15	Sept. 10	G. H. Whyte	1.46	23.0
Sept. 7	do	1.33	17.90	25	J. E. Caughey	1.39	18.3
Oct. 11	do	1.40	21.7	Oct. 14	do	1.50	28.3
Nov. 11	do	1.76	54.16	28	do	1.46	28.0
1913.				1916.			
Apr. 18	do	2.71	222.0	Mar. 29	M. H. French	4.11	612
May 16	E. W. W. Hughes	1.92	84.0	Apr. 4	do	2.92	202
June 18	do	1.81	60.0	7	do	2.76	156
July 17	do	1.36	23.0	May 10	J. E. Caughey	2.29	84
Aug. 2	do	1.20	13.5	June 9	do	2.66	161
22	do	1.21	13.5	July 8	do	2.25	65
Sept. 24	do	1.27	15.9	28	do	3.46	368
Oct. 17	do	1.27	15.4	Aug. 26	L. B. P. Miles	1.90	32
Nov. 10	do	1.26	15.6	Oct. 12	do	[a] 1.91	82
1914.				Nov. 2	do	1.64	53
Mar. 19	M. H. French	3.45	78.0	1917.			
23	do	3.00	30.0	Mar. 22	M. H. French		[b] 22.0
Apr. 6	do	4.55	642.0	24	do		[b] 23.0
10	do	3.10	236.0	31	do		[b] 23.0
13	do	4.33	738.0	Apr. 9	do		[b] 61.0
21	do	1.95	90.0	10	do		[b] 130.0
May 7	F. R. Steinberger	1.69	55.0	18	do		[b] 1,275.0
25	do	1.50	35.0	19	do		[b] 1,207.0
June 26	do	1.39	23.0	20	do		[b] 1,730.0
July 21	do	1.04	5.2	21	do		[b] 2,776.0
Aug. 8	do	.90	2.4	21	do		[b] 2,981.0
20	E. W. W. Hughes	1.04	6.3	23	do		[b] 3,118.0
Sept. 15	do	1.57	37.7	24	do		[b] 2,069.0
Oct. 16	do	1.36	20.4	May 5	do		[b] 1,169.0
1915.				7	do	6.76	[b] 2,291.0
Apr. 10	M. H. French	2.63	194.0	7	do		[b] 2,192.0
13	do	2.28	120.0	9	do		[b] 1,398.0
20	do	1.89	64.0	10	do	5.03	[b] 1,194.0
May 11	J. E. Caughey	1.55	28.0	June 6	do		[b] 157.0
June 16	do	1.65	37.0	7	do	2.17	144.0
July 14	do	1.76	50.0	July 18	do	1.40	30.0
				Sept. 13	do	[c] .64	18.4
				Oct. 29	do	[c] .66	19.2

[a] New artificial control completed Oct. 11, 1916.
[b] Discharge measured at Eastend, 10 miles downstream.
[c] Gage in new channel constructed Aug. 24, 1917.

Daily discharge, in second-feet, of Frenchman River at Phillips's ranch, Sask., 1912–1917.

Day.	July.	Aug.	Sept.	Oct.	Nov	Day.	July.	Aug.	Sept.	Oct.	Nov.
1912.						1912.					
1	.....	13.84	17.00	18.76	26.14	16	22.30	18.76	17.44	22.30	.....
2	.....	14.18	16.28	18.76	26.86	17	22.30	19.70	17.44	23.50	.....
3	.....	14.18	16.28	19.20	28.30	18	21.70	17.88	17.44	23.50	.....
4	.....	15.56	16.28	19.20	29.04	19	20.70	21.70	17.00	23.50	.....
5	.....	17.88	19.70	19.20	29.04	20	20.70	22.30	17.44	23.50	.....
6	.....	18.32	18.76	18.76	30.52	21	20.70	20.70	18.76	23.50	.....
7	.....	17.88	18.32	18.76	31.26	22	20.20	18.76	18.76	23.50	.....
8	.....	17.00	19.20	18.76	36.50	23	19.20	17.44	18.76	23.50	.....
9	26.86	15.56	18.76	18.76	40.74	24	17.88	17.00	18.32	24.10	.....
10	24.10	14.18	17.44	19.20	41.80	25	17.44	16.28	18.32	24.10	.....
11	24.10	14.18	17.88	21.70	41.80	26	17.88	15.56	18.32	24.10	.....
12	24.10	13.84	17.88	21.70	42.92	27	16.64	17.00	18.32	24.10	.....
13	25.42	14.18	17.88	21.70	42.92	28	16.28	18.76	18.76	24.10	.....
14	24.70	14.18	17.44	21.70	41.80	29	15.92	17.88	18.76	24.70	.....
15	23.50	14.86	17.44	22.30	41.80	30	15.20	17.88	18.76	24.70	.....
						31	14.52	17.88	.....	25.42	.....

Daily discharge, in second-feet, of Frenchman River at Phillips's ranch, Sask., 1912–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1913.								
1	.....	.....	70	28.0	29.0	13.7	12.5	15.3
2	.....	.....	66	28.0	30.0	13.4	12.4	15.3
3	.....	.....	70	27.0	28.0	13.0	12.4	14.8
4	.....	.....	69	28.0	28.0	12.9	12.4	15.3
5	.....	.....	63	27.0	31.0	13.2	12.2	16.2
6	.....	999	66	26.0	29.0	13.7	11.8	17.2
7	.....	1,065	60	24.0	32.0	14.5	11.8	16.2
8	.....	1,265	59	23.0	36.0	14.0	11.9	15.3
9	.....	975	59	21.0	34.0	13.7	11.6	15.3
10	.....	836	59	20.0	30.0	13.7	11.6	15.3
11	.....	761	59	19.7	27.0	13.7	11.6	15.3
12	.....	742	57	19.7	27.0	13.4	11.5	14.5
13	.....	801	54	20.0	30.0	13.4	11.6	14.0
14	.....	667	62	29.0	28.0	14.0	11.8	14.5
15	.....	583	75	21.0	28.0	14.2	12.0	14.8
16	.....	493	77	23.0	27.0	15.3	12.4	14.5
17	.....	383	72	37.0	23.0	15.3	12.5	14.5
18	.....	222	68	52.0	13.0	16.2	12.7	14.5
19	.....	211	65	38.0	20.0	15.3	13.4	15.3
20	.....	190	54	50.0	19.7	15.3	13.0	14.8
21	.....	170	52	123.0	18.4	14.8	13.2	14.8
22	.....	132	51	48.0	19.0	14.0	16.7	14.5
23	.....	102	47	41.0	18.4	13.4	17.2	14.8
24	.....	78	47	51.0	17.2	13.0	17.2	14.5
25	.....	70	44	43.0	17.8	13.0	17.2	14.8
26	.....	59	36	49.0	15.8	12.7	16.2	14.5
27	.....	58	32	49.0	15.3	12.7	15.3	15.3
28	.....	65	31	44.0	14.8	12.4	14.5	17.2
29	.....	72	29	36.0	14.8	12.4	14.8	21.0
30	.....	75	28	30.0	14.8	12.4	14.5	58.0
31	.....	.....	28	.....	14.2	12.7	.....	32.0
1914.								
1	.....	45	43	20.0	18.2	4.60	9.1	9.5
2	.....	60	41	19.4	16.4	4.00	8.3	9.9
3	.....	100	41	19.4	14.0	4.00	8.3	10.7
4	.....	250	40	23.0	12.0	1.95	7.5	13.5
5	.....	400	44	32.0	12.5	4.00	6.7	31.0
6	.....	642	47	29.0	8.3	1.50	6.3	36.0
7	.....	520	50	30.0	9.9	2.00	5.2	39.0
8	.....	410	53	27.0	9.1	2.00	4.9	39.0
9	.....	320	74	23.0	9.1	2.00	4.6	50.0
10	.....	236	79	19.4	9.1	1.90	4.0	42.0
11	.....	380	74	19.4	7.5	1.90	4.0	38.0
12	.....	610	67	26.0	6.3	2.00	3.4	33.0
13	5	738	57	30.0	5.2	2.20	13.5	31.0
14	5	479	53	32.0	5.2	2.40	51.0	26.0
15	45	413	45	32.0	5.2	2.40	40.0	22.0
16	550	351	39	28.0	4.6	2.40	33.0	21.0
17	300	190	40	26.0	4.6	2.50	26.0	20.0
18	150	141	37	17.6	4.6	3.40	17.0	19.4
19	78	119	36	15.8	4.6	2.80	14.0	19.4
20	65	95	35	15.2	4.3	2.80	11.5	17.6
21	60	85	33	105.0	5.2	2.40	11.5	15.8
22	40	76	31	50.0	4.3	2.50	12.5	14.6
23	30	67	32	36.0	4.6	3.40	12.5	14.0
24	30	62	42	27.0	5.2	11.10	13.5	13.5
25	30	57	35	23.0	4.3	12.00	13.5	14.6
26	25	54	31	22.0	4.0	10.70	14.0	14.0
27	20	49	25	22.0	4.3	10.70	14.6	13.5
28	20	48	24	20.0	4.3	10.30	12.5	14.0
29	20	48	24	20.0	4.9	11.10	11.1	13.5
30	25	44	24	19.4	4.9	9.90	9.9	13.5
31	40	.....	24	.....	4.3	9.10	.....	13.5

Daily discharge, in second-feet, of Frenchman River at Phillips's ranch, Sask., 1912–1917—Continued.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1915.									
1	.....	.....	68	37	45	37	56.0	15.4	20.0
2	.....	.....	154	36	81	37	47.0	18.4	19.7
3	.....	.....	1,366	36	204	36	41.0	24.0	26.0
4	.....	.....	2,668	35	186	37	39.0	26.0	25.0
5	.....	.....	[a] 2,263	35	136	36	35.0	26.0	24.0
6	.....	.....	945	35	106	36	33.0	23.0	24.0
7	.....	.....	498	32	91	35	30.0	22.0	26.0
8	.....	.....	308	31	81	43	29.0	22.0	25.0
9	.....	.....	244	32	63	47	27.0	22.0	26.0
10	.....	.....	200	30	49	68	26.0	24.0	26.0
11	.....	.....	159	33	47	.124	24.0	22.0	29.0
12	.....	.....	135	27	46	68	24.0	23.0	29.0
13	.....	.....	128	30	45	49	23.0	24.0	28.0
14	.....	.....	125	38	39	49	22.0	26.0	27.0
15	.....	.....	115	55	41	51	22.0	26.0	24.0
16	.....	.....	96	78	41	63	25.0	26.0	24.0
17	.....	.....	85	95	42	75	23.0	23.0	23.0
18	.....	.....	81	138	39	77	24.0	22.0	22.0
19	.....	.....	73	62	43	98	24.0	20.0	22.0
20	.....	.....	66	45	92	84	41.0	20.0	22.0
21	.....	.....	58	43	120	65	30.0	20.0	22.0
22	.....	10	54	40	127	60	26.0	20.0	22.0
23	.....	68	54	37	68	72	23.0	19.0	22.0
24	.....	72	51	36	51	49	22.0	18.4	22.0
25	.....	77	49	47	47	47	20.0	18.4	22.0
26	.....	80	47	60	49	49	18.4	18.4	22.0
27	.....	84	45	86	51	56	15.4	19.0	22.0
28	.....	80	43	70	60	54	13.0	21.0	22.0
29	.....	76	40	60	49	84	13.0	22.0	22.0
30	.....	74	37	54	47	86	13.0	20.0	23.0
31	.....	71	.....	49	.....	72	14.2	.....	22.0
1916.									
1	.....	319	392	92	226	129	87	31	56
2	.....	.....	317	87	178	107	66	31	65
3	.....	.....	261	74	150	96	52	31	75
4	.....	.....	210	98	118	127	48	36	85
5	.....	.....	185	98	108	121	46	40	90
6	.....	.....	168	96	175	100	49	42	95
7	.....	.....	155	88	321	78	48	40	90
8	.....	.....	152	123	205	70	44	40	90
9	.....	.....	178	103	131	66	47	41	87
10	.....	.....	276	70	110	75	63	40	83
11	.....	319	384	73	140	72	70	38	80
12	.....	640	378	70	412	57	69	38	82
13	.....	1,329	311	65	374	51	63	34	89
14	.....	1,159	295	58	229	48	54	32	89
15	.....	989	285	62	148	46	48	32	83
16	.....	819	223	65	118	44	43	32	78
17	.....	649	175	68	102	47	40	32	70
18	.....	479	175	65	87	52	39	32	67
19	.....	309	195	61	77	54	35	31	64
20	.....	162	171	54	73	54	35	30	62
21	192	600	148	54	68	52	35	28	59
22	588	1,040	135	52	74	46	37	27	59
23	745	1,290	131	53	155	40	35	26	59
24	647	530	116	56	246	37	32	28	59
25	662	160	107	127	192	35	31	31	59
26	1,026	140	92	202	133	37	34	34	57
27	785	893	92	314	107	157	33	44	55
28	610	893	102	409	92	388	32	60	54
29	460	670	123	388	84	197	32	60	53
30	.....	459	102	374	107	152	32	58	57
31	.....	371	.....	323	.....	114	32	.....	55

[a] Ice present.

Daily discharge, in second-feet, of Frenchman River at Phillips's ranch, Sask., 1912–1917—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1917.							
1	23	940	148	57	20.0	17.0	17.0
2	23	1,040	161	54	20.0	17.5	16.5
3	23	1,517	220	54	20.0	17.0	16.5
4	23	1,488	218	52	20.0	18.0	16.2
5	23	1,169	183	62	20.0	18.5	16.0
6	30	1,831	165	59	19.5	16.5	16.5
7	40	2,135	159	49	19.5	16.0	17.2
8	50	1,529	139	47	18.5	15.8	17.2
9	61	1,303	131	44	17.5	18.5	17.0
10	130	1,169	123	42	17.5	18.8	17.5
11	380	1,136	131	41	17.5	18.5	16.2
12	825	1,927	202	40	17.0	18.8	16.5
13	1,315	910	220	37	17.0	18.2	16.8
14	1,935	862	172	37	16.5	18.5	16.8
15	2,900	778	135	36	16.5	16.2	18.0
16	2,260	642	115	35	16.0	17.5	19.5
17	1,325	683	97	33	15.5	17.0	20.0
18	1,240	581	87	28	15.5	16.8	18.8
19	1,240	394	77	26	14.5	16.2	21.0
20	1,825	313	74	25	14.0	16.0	22.0
21	3,871	284	70	23	13.7	16.0	22.0
22	4,041	254	68	22	13.0	16.0	25.0
23	3,118	244	68	22	12.6	16.0	19.0
24	1,230	225	68	22	15.0	27.0	18.8
25	985	206	64	22	15.2	28.0	17.5
26	1,205	188	59	22	15.5	27.0	17.5
27	1,315	181	56	22	15.8	23.0	21.0
28	1,401	183	56	21	16.0	20.0	22.0
29	1,066	179	53	20	16.0	19.0	19.0
30	965	163	54	20	16.5	18.0	18.8
31	.....	154	.....	20	16.8	.....	17.5

NOTE.—1915: Mar. 22, stage-discharge relation affected by ice; discharge determined from measurement at Eastend.

1916: Feb. 21 to Mar. 1, discharge determined from slope data; determinations probably inaccurate. Mar. 2–10, no records. Mar. 11–26, discharge estimated except for Mar. 13, which was determined from head on Strong's dam, and Mar. 20, which was measured with current meter at Eastend. Work on new control was begun Sept. 30 and completed Oct. 11; discharge estimated Sept. 29 to Oct. 11 and determined by measurement at Eastend Oct. 12.

1917: Discharge Apr. 1–20, 23, 25, 26, and May 5 estimated from discharge measurements and data obtained at Eastend.

Monthly discharge of Frenchman River at Phillips's ranch, Sask., 1912–1917.

[Drainage area, 589 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1912.						
July 9–31	26.86	14.52	22.60	0.036	0.031	1,031
August	22.30	13.84	16.95	.031	.031	1,042
September	19.70	16.28	17.97	.029	.032	1,068
October	25.42	18.76	21.95	.035	.040	1,350
November 1–15	42.92	26.14	35.43	.057	.032	1,054
The period	.....	.....	.....	.....	.166	5,545
1913.						
April 6–30	1,265.0	58.0	443.0	.741	.689	21,965
May	77.0	28.0	55.0	.092	.106	3,388
June	123.0	19.7	36.0	.060	.067	2,130
July	36.0	13.0	24.0	.039	.045	1,451
August	16.2	12.4	13.7	.023	.026	842
September	17.2	11.5	13.3	.022	.024	791
October	58.0	14.0	17.2	.029	.033	1,058
The period	.....	.....	.....	.....	.990	31,625

Monthly discharge of Frenchman River at Phillips's ranch, Sask., 1912–1917—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1914.						
March 13–31	550.0	5.00	81.0	0.135	0.095	3,050
April	738.0	44.00	236.0	.395	.441	14,043
May	79.0	24.00	43.0	.071	.082	2,619
June	105.0	15.20	28.0	.046	.051	1,697
July	18.2	4.00	7.1	.012	.014	437
August	12.0	1.50	4.8	.008	.009	295
September	51.0	3.40	13.5	.023	.026	803
October	50.0	9.50	22.0	.037	.043	1,353
The period					1.620	24,297
1915.						
March 22–31	84	10.0	69	.115	.04	1,368
April	2,668	37.0	342	.572	.64	20,350
May	138	27.0	49	.082	.09	3,013
June	204	39.0	73	.122	.14	4,344
July	124	35.0	60	.100	.12	3,689
August	56	13.0	27	.045	.05	1,660
September	26	15.4	22	.037	.04	1,309
October	29	19.7	24	.040	.05	1,476
The period					1.17	37,209
1916.						
February 21–29	1,026	192	635	1.060	.35	11,333
March 1, 11–31	1,329	319	646	1.080	.88	28,182
April	392	92	201	.336	.37	11,960
May	409	52	127	.212	.24	7,709
June	412	68	158	.264	.29	9,402
July	388	35	89	.149	.17	5,472
August	87	31	46	.077	.09	2,828
September	60	26	37	.062	.07	2,202
October	95	53	71	.119	.14	4,366
The period					2.60	83,554
1917.						
April	4,041	23.0	1,162.0	1.943	2.17	69,144
May	2,135	154.0	794.0	1.328	1.53	48,821
June	220	53.0	119.0	.199	.22	7,081
July	62	20.0	35.0	.059	.07	2,152
August	20	12.6	16.7	.028	.03	1,027
September	28	15.8	18.6	.031	.03	1,107
October	25	16.0	18.4	.031	.04	1,131
The period					4.09	130,463

NOTE.—Area used in computing these tables is the same as published in the Canadian hydrometric reports which was changed from time to time as more definite information of the drainage basin was obtained.

Mean monthly discharge, in second-feet, of Frenchman River at Phillips's ranch, Sask., 1909–1917.

Year.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total in acre-feet.
1909	.....	.....	a554	242	205	143.0	33.0	21.0	41.0	.....	52,666
1910	.....	.....	a54	39	21	6.5	5.1	6.9	10.5	.....	6,854
1911	.....	.....	401	83	53	37.0	22.0	21.0	32.0	.....	38,967
1912	.....	.....	a524	173	59	34.0	22.0	27.0	17.0	a27	39,760
1913	.....	.....	a443	55	36	24.0	13.7	13.3	17.2	.....	36,020
1914	.....	b50	236	43	28	7.1	4.8	13.5	22.0	.....	24,321
1915	.....	a54	342	49	73	60.0	27.0	22.0	24.0	.....	37,209
1916	a635	a646	201	127	158	89.0	46.0	37.0	71.0	.....	83,554
1917	.....	.....	1,162	794	119	35.0	16.7	18.6	18.4	.....	130,463
Average	.....	50	468	178	84	48	21	20	28	.....	49,979
Average run-off, acre-feet	.....	3,074	27,848	10,945	4,998	2,951	1,291	1,190	1,722	.....	54,019
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	85

a Incomplete record not included in average.
b Reduced to monthly average.

NOTE.—Records of Frenchman River at Eastend used for years 1909–12.

A. ENRIGHT & STRONG'S DAM ON FRENCHMAN RIVER NEAR EASTEND, SASKATCHEWAN.

B. FORT BELKNAP INDIAN DAM FOR AGENCY DITCH, ON MILK RIVER NEAR HARLEM, MONT.

FRENCHMAN RIVER AT EASTEND, SASK.

LOCATION.—At Enright & Strong's ranch, in SE. ¼ sec. 31, T. 6, R. 21 W. third meridian, at the Canadian Pacific Railway bridge about half a mile east of the Eastend depot. (See Pl. XXIV, *A*.)

DRAINAGE AREA.—648 square miles.

RECORDS AVAILABLE.—Incomplete records of open water flow from April 21, 1909, to October 31, 1916.

GAGE.—Vertical staff fastened to the downstream pile of the fifth bent from the west end of the bridge; read by Byron Walters, William Joseph Brummitt, and C. Torkelson.

DISCHARGE MEASUREMENTS.—Made by wading or from a bridge.

CHANNEL AND CONTROL.—Bed sandy and clean; not likely to shift. Banks high but subject to overflow. An artificial control was constructed of sheet piling and rock one-quarter mile downstream from gage.

EXTREMES OF DISCHARGE.—Maximum stage recorded during period, 10.35 feet April 4, 1915 (discharge measured 2,750 second-feet); minimum stage recorded, 1.03 feet (discharge, 0.1 second-foot) September 6 to 9, 1910. (See hydrograph, Pl. XXV.)

ICE.—Station not maintained during winter.

DIVERSIONS.—A number of authorized projects divert water for irrigation above this station. A small quantity of return flow finds its way to river channel above gage. Amount of water diverted by Enright & Strong's ditch, above the station, is added to the flow in the river to obtain daily discharge.

ACCURACY.—Stage-discharge relation practically permanent except during spring break-up, when it is affected by ice. Gage read daily to hundredths. Discharge for early spring estimated from discharge measurements; discharge for other periods obtained by applying daily gage heights to rating table. Gage-height observations in the years 1911, 1912, 1913, 1914, and 1916 unreliable; record of daily discharge for these years roughly approximate; other records fair.

Discharge measurements of Frenchman River at Eastend, Sask., 1908–1916.

Date.	Made by—	Gage height.	Discharge.
1908.		*Feet.*	*Sec.-ft.*
July 13	F. T. Fletcher	.....	0.47
31	....do	1.10	1.4
Aug. 5	....do	.....	.....
1909.			
Apr. 19	F. T. Fletcher	.....	[a] 93.2
30	....do	2.94	224.4
May 1	....do	2.52	159.8
19	H. R. Carscallen	3.465	311.2
June 8	....do	1.55	37.9
26	....do	3.34	266.6
July 13	....do	3.15	249.5
31	....do	1.93	73.5
Aug. 23	....do	1.36	13.5
Sept. 21	....do	1.42	17.0
1910.			
Apr. 18	H. R. Carscallen	2.04	63.57
May 11	....do	1.75	35.59
31	....do	1.35	8.88
June 17	R. G. Swan	1.36	8.52
July 15	....do	1.1	.77
Aug. 3	R. J. Burley	.....	[b] .22
3	....do	.....	[b] .24
4	R. G. Swan	1.06	[b] .22
6	R. J. Burley	.....	[b] .29
8	....do	.....	[b] .4
11	....do	1.07	[b] .24
16	....do	1.14	[b] .66
26	R. G. Swan	1.1	[b] .36
Sept. 16	....do	1.13	[b] .92
Oct. 12	....do	1.11	[b] .72
1911.		*Feet.*	*Sec.-ft.*
Apr. 13	G. H. Whyte	4.520	465.95
17	....do	5.155	556.83
17	....do	6.280	943.67
May 3	....do	2.360	86.21
June 5	....do	1.550	24.89
July 5	....do	1.900	49.36
10	....do	1.660	31.04
27	....do	1.320	8.59
Aug. 3	....do	1.270	5.64
31	....do	1.230	4.31
Oct. 14	....do	2.530	29.26
1912.			
Apr. 24	G. H. Whyte	4.705	324.4
25	....do	4.63	321.1
May 13	J. S. Wright	3.78	169.1
June 8	....do	2.77	60.5
July 2	....do	1.94	12.0
29	....do	1.74	6.9
Aug. 24	....do	1.89	8.2
Oct. 7	....do	1.98	19.1
Nov. 2	....do	2.18	13.2
1913.			
Apr. 24	J. S. Wright	3.05	106.0
May 12	E. W. W. Hughes	2.69	71.0
June 9	....do	1.66	14.4
July 14	....do	2.19	25.0
30	....do	1.93	14.3
Aug. 23	....do	2.03	13.1
Oct. 16	....do	3.69	14.4
Nov. 7	....do	3.69	18.2

[a] Ice present.

[b] Discharge determined by using a 36-inch weir.

Discharge measurements of Frenchman River at Eastend, Sask., 1908–1916.—Contd.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*	1915.		*Feet.*	*Sec.-ft.*
Apr. 14	M. H. French	5.66	540.00	May 8	J. E. Caughey	1.43	15.0
17	do	4.41	268.00	June 14	do	1.72	40.0
18	do	4.10	191.00	July 8	do	1.67	37.0
20	do	3.64	95.00	30	do	2.11	81.0
May 2	F. R. Steinberger	3.28	37.00	Aug. 21	do	1.69	35.0
22	do	3.25	14.80	Sept. 9	G. H. Whyte	1.58	29.0
June 22	do	3.24	55.00	22	J. E. Caughey	1.52	21.0
July 16	do	3.12	4.40	Oct. 12	do	1.65	32.0
Aug. 4	do	3.06	3.00	26	do	1.56	28.0
15	E. W. W. Hughes	3.18	2.10				
22	do	.74	[a] 1.81	1916.			
Sept. 17	do	1.34	[a] 21.00	Mar. 20	M. H. French	5.28	162
				30	do	4.98	419
1915.				31	do	3.96	412
Mar. 16	M. H. French	3.20	18.2	Apr. 1	do	3.75	387
25	do	3.50	77.0	3	do	3.21	278
27	do	3.30	84.0	8	do	2.66	164
Apr. 1	do	3.02	68.0	May 6	J. E. Caughey	2.43	110
2	do	3.65	137.0	12	do	1.96	41
4	do	10.35	2,750.0	June 14	do	3.14	310
5	do	9.35	2,042.0	July 7	do	2.25	78
6	do	5.95	1,070.0	20	do	2.04	51
9	do	3.09	256.0	31	L. P. B. Miles	2.61	146
14	do	2.52	134.0	Aug. 26	do	1.83	32
15	do	2.50	141.0	Sept. 27	do	1.92	32
19	do	2.16	82.0	Nov. 4	do	2.03	51

[a] New station.

Daily discharge, in second-feet, of Frenchman River at Eastend, Sask., 1909–1916.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1909.									
1	.....	.....	158	61.3	159	63.1	24.2	16.6	.....
2	.....	.....	128	52.5	147	52.7	24.2	16.6	.....
3	.....	.....	350	22.4	118	42.7	22.6	16.6	.....
4	.....	.....	921	31.4	107	41.1	22.6	16.6	.....
5	.....	.....	841	41.4	179	42.7	24.2	16.6	.....
6	.....	.....	487	31.4	261	41.1	24.2	16.4	.....
7	.....	.....	265	41.4	281	39.6	22.6	16.6	.....
8	.....	.....	187	41.4	202	41.1	24.2	17.4	.....
9	.....	.....	144.4	49.5	156	42.7	24.2	17.4	.....
10	.....	.....	179.5	62.4	114	44.4	22.6	17.4	.....
11	.....	.....	154.5	63.4	399	41.1	22.6	17.4	.....
12	.....	.....	253.8	49.5	277	41.1	22.6	17.4	.....
13	.....	.....	224.5	49.5	262	41.1	22.6	[a]225.0	.....
14	.....	.....	198.5	39.5	216	39.6	22.6	81.1	.....
15	.....	.....	168.5	34.5	199	39.6	27.1	81.1	.....
16	.....	.....	125.5	24.4	152	28.5	27.1	57.1	.....
17	.....	.....	158.4	25.5	139	20.6	19.0	57.1	.....
18	.....	.....	363.8	31.4	97.8	20.6	19.0	57	.....
19	.....	.....	329.8	52.5	73.6	19.5	27.1	57	.....
20	.....	.....	137.4	222.5	96.4	18.8	18.1	45	.....
21	.....	904	213.5	1,348.0	84.6	18.8	17.4	45	.....
22	.....	745	150.5	1,534	83.5	18.8	17.4	45	.....
23	.....	595	169.5	503	60.6	21.2	17.4	45	.....
24	.....	352	313.8	396	49.6	24.2	17.4	35	.....
25	.....	455	266.4	295	37.4	21.2	17.4	35	.....
26	.....	650	169.5	261	64.7	22.6	16.6	35	.....
27	.....	745	115.8	214	103.0	24.2	16.6	35	.....
28	.....	507	101.8	155	101.0	24.2	16.6	35	.....
29	.....	369	87.5	203	76.7	22.6	16.6	35	.....
30	.....	219	46.4	203	64.7	30.9	16.6	35	.....
31	.....	.....	80.4	.....	75.1	28.4	.....	35	.....

[a] Enright & Strong released the head on their dam.

Daily discharge, in second-feet, of Frenchman River at Eastend, Sask., 1909–1916—Continued.

Date.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1910.							
1	.....	44.2	23.8	13.7	4.4	0.9	9.1
2	.....	44.2	23.8	12.9	4.4	2.7	9.1
3	.....	44.2	23.8	11.7	4.1	2.7	9.1
4	.....	44.2	22.9	11.7	5.6	2.7	9.1
5	.....	44.2	22.9	12.2	5.6	2.7	9.1
6	.....	44.2	21.9	12.5	7.1	2.5	9.1
7	.....	44.2	23.4	7.6	6.5	2.5	9.1
8	.....	44.2	23.4	7.3	7.9	2.7	8.8
9	.....	39.9	23.4	1.9	7.6	2.7	8.8
10	.....	39.9	23.4	1.9	7.6	8.5	7.3
11	.....	36.7	25.1	1.5	7.6	8.6	7.3
12	.....	36.7	25.1	4.4	7.6	8.7	12.4
13	.....	36.7	25.1	4.4	7.6	9.0	12.4
14	.....	42.3	25.1	1.3	7.6	9.7	12.4
15	.....	42.3	25.1	2.1	6.0	9.7	11.9
16	.....	46.4	24.1	.8	6.0	9.2	11.9
17	.....	46.4	22.5	.8	5.7	9.2	11.9
18	65	46.4	25.4	1.4	5.7	9.4	12.2
19	65	46.4	24.6	1.8	5.7	6.5	12.2
20	59.8	46.4	24.6	3.0	5.3	6.5	12.5
21	59.2	37.2	21.0	4.0	5.3	7.7	12.5
22	59.2	37.2	17.8	4.0	5.6	8.0	12.1
23	59.2	40.9	17.8	7.7	5.6	8.0	12.1
24	54.0	43.5	17.8	8.5	3.5	9.1	11.1
25	54.0	40.8	15.7	11.5	3.5	9.1	11.1
26	49.0	33.9	14.6	11.5	2.4	9.4	11.1
27	49.0	26.9	14.1	12.8	2.1	10.0	11.1
28	44.2	24.3	13.7	8.5	1.5	9.7	11.1
29	44.2	24.3	13.7	8.5	.7	9.6	8.9
30	44.2	24.3	13.7	4.9	.7	9.6	8.9
31	.....	24.3	.....	4.4	.9	.....	8.9
1911.							
1	485	102	63.6	51.6	21.8	14.0	9
2	439	112	68.6	59.6	19.4	11.2	16
3	439	98	72.6	59.6	16.8	11.2	18
4	336	88	55.6	67.1	17.3	13.2	25
5	300	98	56.6	67.8	23.5	52.8	28
6	223	93	55.6	58.1	22.7	61.0	27
7	238	84	55.6	62.1	21.0	36.1	30
8	157	62	51.6	50.2	21.1	19.0	36
9	157	34	47.6	40.1	20.5	16.0	36
10	904	44.9	58.5	30.9	22.7	14.0	32
11	1,870	89.1	57.4	33.0	27.7	14.0	36
12	1,126	89.1	70.0	32.9	26.2	13.0	35
13	516	99.6	43.1	32.9	24.9	11.0	36
14	344	90.6	30.6	33.8	20.7	12.0	35
15	295	97.2	36.6	34.1	22.7	20.0	34
16	144	99.6	33.6	32.1	23.4	21.0	32
17	738	99.6	55.6	29.4	23.1	21.0	23
18	742	90.6	44.6	28.2	24.7	21.0	27
19	388	86.6	36.6	27.3	25.6	19.0	26
20	319	90.6	44.6	28.1	26.1	19.0	27
21	310	81.6	114	27.0	24.1	20.0	30
22	287	76.6	47.6	26.9	22.6	19.0	33
23	253	72.6	44.6	27.5	20.7	16.0	38
24	196	81.6	59.6	28.0	19.9	13.0	42
25	170	81.6	47.6	25.7	22.8	12.0	41
26	158	72.6	40.6	24.5	26.4	9.4	43
27	146	72.6	44.6	23.1	23.3	7.6	39
28	128	72.6	44.6	19.1	21.5	[a] 41.0	38
29	117	63.6	44.6	23.9	21.1	60.0	36
30	98	72.6	55.6	24.6	19.6	23.0	38
31	.....	72.6	.....	24.0	14.2	.....	39

[a] Flash boards taken off dam Sept. 28. From this date to the end of season gage heights were affected by work of beavers.

Daily discharge, in second-feet, of Frenchman River at Eastend, Sask., 1909–1916—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1912.								
1	.....	263.8	149.9	28.8	28.0	23.8	16.35	19.95
2	.....	258.4	110.0	30.4	27.5	23.4	16.35	22.10
3	.....	229.9	102.0	35.4	27.5	23.6	15.55	18.75
4	.....	219.7	93.0	36.9	27.3	23.4	14.75	19.15
5	.....	216.3	83.0	37.5	26.6	23.2	13.55	19.55
6	.....	211.2	65.6	37.0	26.3	22.7	13.55	20.35
7	.....	218.0	57.6	36.3	26.8	20.75	12.45	21.65
8	.....	231.6	61.6	36.1	26.2	20.35	13.95	23.00
9	.....	253.0	46.6	34.9	25.6	20.35	14.75	22.10
10	.....	260.2	41.0	35.1	24.6	20.35	13.95	25.50
11	.....	212.9	41.0	34.2	24.6	21.20	13.55	34.50
12	.....	193.5	35.1	34.0	24.5	20.35	13.15	38.90
13	1,460.0	169.4	33.3	33.9	23.8	20.35	13.15	39.60
14	891.0	153.8	38.2	34.6	23.6	19.15	13.95	42.40
15	773.4	147.3	93.0	34.2	22.5	18.75	14.75	43.10
16	695.2	146.0	98.0	34.5	22.5	17.95	14.75	.....
17	685.0	137.6	85.0	34.2	22.0	17.95	17.15	.....
18	625.0	130.4	77.4	34.0	21.5	17.95	17.15	.....
19	526.6	118.7	83.0	33.1	20.0	18.75	17.95	.....
20	449.4	112.1	52.0	32.9	17.9	[a] 177.6	18.35	.....
21	425.6	113.2	44.5	32.9	17.5	72.25	20.35	.....
22	423.5	112.1	52.1	33.2	16.0	20.35	19.95	.....
23	383.6	111.0	58.8	32.6	14.5	19.95	20.35	.....
24	342.0	114.3	25.5	32.3	15.9	18.75	20.35	.....
25	316.0	81.0	22.8	32.6	16.9	18.35	21.20	.....
26	314.0	83.0	23.0	32.9	16.0	17.95	21.20	.....
27	298.0	92.0	24.7	32.6	16.9	17.55	21.20	.....
28	286.2	131.6	26.6	32.6	19.3	17.15	21.20	.....
29	271.0	221.4	26.2	32.3	23.0	17.15	21.20	.....
30	263.8	212.9	26.2	31.8	24.2	16.35	21.20	.....
31	.....	216.3	.....	30.7	24.1	.....	20.75	.....
1913.								
1	.....	72	76.9	30.0	14.1	.....	.....	.....
2	.....	64	75.9	28.0	13.9	.....	.....	.....
3	.....	59	65.9	28.0	13.9	.....	.....	.....
4	498	[b] 55	56.9	28.0	13.8	.....	.....	.....
5	590	[b] 56	48.1	28.0	13.7	.....	.....	.....
6	830	[b] 56	31.5	29.0	13.7	.....	.....	.....
7	1,135	[b] 57	31.2	29.0	13.6	.....	.....	.....
8	1,174	[b] 58	30.2	28.0	13.5	.....	.....	.....
9	836	[b] 58	30.1	26.0	13.5	.....	.....	.....
10	759	[b] 58	14.1	22.0	13.4	.....	.....	.....
11	675	[b] 59	13.6	[b] 22.0	13.3	.....	.....	.....
12	679	60	13.3	22.0	13.3	.....	.....	.....
13	693	63	13.7	[b] 23.0	13.2	.....	.....	.....
14	640	62	13.5	24.0	13.2	.....	.....	.....
15	506	69	13.7	22.0	13.3	.....	.....	.....
16	402	75	13.7	21.0	13.3	.....	.....	.....
17	336	80	13.8	20.0	13.3	.....	.....	.....
18	255	84	16.4	[b] 20.0	13.3	.....	.....	.....
19	177	94	24.0	19.4	13.4	.....	.....	.....
20	[c] 52	94	71.0	18.8	13.3	.....	.....	.....
21	114	94.0	65.0	17.8	13.3	.....	.....	.....
22	110	101.0	71.0	16.8	13.2	.....	.....	.....
23	120	103.4	76.0	16.0	13.1	.....	.....	.....
24	107	106.4	65.0	15.6	.....	.....	.....	.....
25	62	118.4	61.0	15.2	.....	.....	.....	.....
26	36	112.4	52.0	15.0	.....	.....	.....	.....
27	52	109.4	48.0	14.8	.....	.....	.....	.....
28	57	107.5	42.0	14.5	.....	.....	.....	.....
29	60	106.9	38.0	14.3	.....	.....	.....	.....
30	62	95.9	35.0	14.3	.....	.....	.....	.....
31	.....	89.9	.....	14.2	.....	.....	.....	.....

[a] Flash boards taken out of Strong & Day's dam.
[b] Interpolated.
[c] Putting flash boards in Strong & Day's dam.

Daily discharge, in second-feet, of Frenchman River at Eastend, Sask., 1909–1916—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1914.								
1	.....	45.0	18.6	38.8	22.8	3.10	2.5	7.8
2	.....	62.0	24.9	39.8	20.6	3.10	2.5	8.1
3	.....	105.0	29.8	34.2	15.9	3.10	2.5	10.5
4	.....	235.0	34.9	27.0	15.3	3.10	2.5	13.2
5	.....	400.0	37.8	20.8	14.8	3.40	2.7	19.5
6	.....	500.0	37.1	28.6	13.4	3.40	3.1	26.0
7	.....	800.0	37.1	20.5	10.7	3.10	3.1	22.0
8	.....	650.0	37.8	22.5	10.1	3.40	3.1	28.0
9	.....	475.0	39.2	29.3	7.8	3.70	3.1	32.0
10	.....	360.0	41.2	18.2	5.6	3.70	3.1	33.0
11	.....	280.0	41.2	15.5	5.0	3.40	3.1	26.0
12	.....	260.0	40.2	13.7	3.8	3.40	3.1	20.0
13	5	889.0	37.8	15.7	3.0	3.10	11.7	21.0
14	5	585.0	36.4	12.7	2.7	3.10	29.0	22.0
15	45	431.0	33.6	11.2	1.8	3.10	33.0	26.0
16	550	350.0	36.4	14.7	[a] 5.2	3.40	25.0	39.0
17	310	308.0	36.4	17.0	[a] 4.7	3.70	22.0	37.0
18	170	180.0	39.2	23.8	[a] 8.2	4.50	14.6	32.0
19	80	133.0	37.8	20.5	[a] 7.6	5.00	11.4	32.0
20	75	89.0	36.4	32.3	[a] 4.3	3.70	10.2	32.0
21	50	80.0	37.1	130.0	[a] 4.2	3.10	9.0	32.0
22	40	25.0	35.1	78.7	[a] 4.2	[b] 1.78	9.0	32.0
23	40	48.0	31.1	31.6	[a] 4.2	2.30	8.1	32.0
24	37	35.0	33.6	29.0	[a] 3.9	2.30	7.5	31.0
25	30	25.0	33.4	23.0	[a] 3.6	2.50	7.5	31.0
26	22	18.6	32.8	22.0	[a] 3.6	2.90	7.5	31.0
27	20	18.6	36.8	22.0	[a] 3.8	2.30	7.5	30.0
28	20	18.6	34.2	20.0	[a] 3.5	2.50	7.5	30.0
29	20	17.2	37.9	20.0	[a] 3.5	2.50	7.5	31.0
30	25	17.2	35.8	19.4	[a] 3.5	2.50	7.5	31.0
31	40	.....	38.3	.....	3.1	2.50	.....	31.0
1915.								
1	.....	68.0	49.0	49.5	61.3	69.8	17.2	24
2	.....	154.0	17.1	159.4	[c] 59.4	65.6	18.2	23
3	.....	1,366.0	15.4	180.8	56.4	62.4	19.5	25
4	.....	2,669.0	22.0	177.7	54.7	54.4	19.5	23
5	.....	2,263.0	21.4	170.1	55.0	50.4	115.7	23
6	.....	975.0	26.5	131.5	59.5	40.2	73.0	25
7	.....	594.0	25.7	98.0	61.4	39.5	43.4	24
8	.....	335.0	31.4	92.2	43.5	40.6	32.0	24
9	.....	252.0	35.1	76.2	48.8	31.0	29.0	25
10	.....	224.0	34.6	76.7	50.0	30.3	26.0	25
11	.....	182.0	33.3	74.7	75.5	26.4	27.0	25
12	.....	151.0	32.0	72.1	71.7	26.4	29.0	25
13	.....	135.0	32.0	61.1	73.1	24.3	29.0	29
14	.....	142.0	33.2	50.0	63.4	24.2	28.0	30
15	.....	138.0	115.4	48.7	73.4	23.6	30.0	29
16	18.2	66.0	243.0	49.7	75.2	23.7	29.0	29
17	[d] 18.2	146.0	86.0	46.2	78.0	24.2	29.0	29
18	19.2	96.0	96.4	41.8	84.0	23.3	27.0	27
19	17.2	85.0	86.3	46.7	86.0	23.0	30.0	27
20	19.8	82.0	56.6	67.0	111	23.0	33.0	25
21	26.0	77.0	52.3	99.7	107.0	37.0	29.0	27
22	[d] 20.0	67.0	51.0	128.4	102.0	38.0	25.0	26
23	[d] 68.0	30.1	47.4	106.7	97.0	35.3	24.0	25
24	134.0	15.9	28.4	104.4	92.0	29.7	25.0	23
25	77.0	18.7	36.4	110.0	84.4	27.3	23.0	23
26	55.0	46.3	66.2	106.7	78.6	24.7	23.0	25
27	84.0	46.3	65.6	43.7	75.0	24.4	24.0	26
28	[d] 80.0	43.6	82.0	83.3	67.5	21.9	24.0	26
29	[d] 76.0	42.1	87.0	83.3	62.7	20.0	25.0	26
30	[d] 74.0	61.1	82.0	84.3	75.8	19.5	24.0	24
31	[d] 71.0	.....	62.2	.....	82.6	17.5	.....	24

[a] Discharge obtained from weir measurements.
[b] New station established.
[c] Interpolated.
[d] Estimated.

Daily discharge, in second-feet, of Frenchman River at Eastend, Sask., 1909–1916—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1916.								
1	.....	387	69	531	77.1	107.7	34	46
2	.....	452	57	491	102.0	84.4	46	54
3	.....	278	122	491	93.8	68.3	33	58
4	.....	244	105	491	93.6	49.6	32	58
5	.....	173	124	411	86.5	43.7	32	58
6	.....	155	105	371	86.3	43.2	33	62
7	.....	159	88	370	86.1	43.4	31	65
8	.....	166	88	330	77.5	41.2	38	66
9	.....	166	88	294	73.3	44.5	37	66
10	.....	400	88	260	73.9	51.4	36	77
11	.....	484	88	259	60.1	54.7	35	82
12	.....	524	72	228	59.4	62.6	32	88
13	.....	364	72	199	55.5	65.6	31	91
14	.....	328	72	199	50.9	62.4	32	91
15	.....	257	58	175	50.2	58.4	31	93
16	.....	196	58	174	50.5	53.0	30	91
17	.....	173	58	152	49.9	49.5	32	80
18	.....	173	58	151	68.3	42.8	32	77
19	*a* 180	110	46	131	60.7	41.2	31	72
20	162	64	46	130	53.1	41.5	31	66
21	*a* 650	64	46	130	53.1	39.7	31	64
22	*a*1,100	51	46	111	48.7	38.6	32	62
23	*a*1,400	65	46	111	38.7	36.7	32	61
24	*a* 700	80	46	110	38.7	41.0	31	58
25	*a* 300	52	58	129	48.7	38.4	32	61
26	*a* 240	66	144	110	60.7	42.6	32	59
27	*a* 950	53	250	92.9	48.7	42.8	33	61
28	*a*1,025	82	440	92.7	363.0	42.8	42	59
29	*a* 620	54	440	76.5	239.7	40.7	43	58
30	419	68	480	76.3	183.7	34.3	44	62
31	412	.....	480	.....	148.7	33.3	.....	61

a Estimated.

NOTE.—1912: Ice present Apr. 1–12; data inadequate to determine discharge.
1913: Ice in river Apr. 3. Shifting control Apr. 24 to June 9, July 15–29, and July 31 to Aug. 22. No observer after Aug. 23.
1914: Discharge estimated Mar. 13 to Apr. 12 and June 23–30.

Monthly discharge of Frenchman River at Eastend, Sask., 1909–1916.

[Drainage area, 648 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1909.						
April 21–30	904	219.0	554.0	0.855	0.318	10,988
May	921	46.4	242.0	.373	.430	14,880
June	1,534	22.4	204.7	.322	.359	12,182
July	399	37.5	143.1	.225	.259	8,801
August	63	18.4	32.9	.052	.060	2,021
September	27	16.6	21.1	.033	.037	1,257
October	225	16.4	41.3	.065	.075	2,537
The period	.....	.....	.....	.....	1.538	52,666
1910.						
April 18–30	64.40	44.20	54.32	.086	.041	1,400
May	46.40	24.30	39.29	.062	.071	2,416
June	25.10	13.70	21.34	.034	.038	1,270
July	13.70	.80	6.51	.010	.012	400
August	7.60	.70	5.06	.008	.009	311
September	10.00	.90	6.91	.011	.012	411
October	12.50	7.30	10.50	.017	.020	646
The period	.....	.....	.....	.....	.203	6,854

Monthly discharge of Frenchman River at Eastend, Sask., 1909–1916—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1911.						
April	1,870	98.0	401.0	0.587	0.655	23,861
May	112	34.0	82.9	.121	.140	5,097
June	114	31.0	53.2	.078	.087	3,166
July	68	19.0	36.6	.054	.062	2,250
August	28	14.0	22.2	.033	.038	1,365
September	61	7.6	21.4	.031	.035	1,273
October	43	9.0	31.8	.047	.054	1,955
The period	.....	.....	.....	.....	1.071	38,967
1912.						
April 13–30	1,460	263.8	523.5	.766	.51	18,690
May	263.8	81	173.2	.254	.29	10,649
June	149.9	22.8	58.9	.086	.096	3,505
July	37.5	28.81	33.7	.049	.057	2,072
August	28	14.5	22.4	.033	.038	1,377
September	177.6	16.3	26.9	.038	.042	1,601
October	21.2	12.4	17.1	.025	.03	1,051
November 1–15	43.1	18.7	27.4	.040	.02	815
The period	.....	.....	.....	.....	1.08	39,760
1913.						
April 4–30	1,174	36.0	408.0	.597	.599	21,832
May	118	55.0	79.9	.117	.135	4,913
June	77	13.3	40.7	.060	.067	2,422
July	30	14.2	21.2	.031	.036	1,304
August 1–23	14.1	13.1	13.5	.020	.017	616
The period	.....	.....	.....	.....	.854	31,087
1914.						
March 13–31	550	5.00	83.0	.129	.091	3,141
April	889	17.20	247.0	.382	.426	14,722
May	41	25.00	36.0	.056	.065	2,183
June	130	11.20	28.0	.043	.048	1,678
July	23.0	1.80	7.2	.011	.013	443
August	5	1.78	3.1	.005	.006	192
September	33	2.50	9.0	.014	.016	536
October	39	7.80	27.0	.041	.047	1,642
The period	.....	.....	.....	.....	.712	24,537
1915.						
March 16–31	134	17.2	54	.083	.05	1,714
April	2,669	15.9	352	.543	.61	20,945
May	243	15.4	57	.088	.10	3,505
June	181	42.0	91	.140	.16	5,415
July	111	44.0	73	.113	.13	4,489
August	70	17.5	33	.051	.06	2,029
September	116	17.2	31	.048	.05	1,845
October	30	23.0	26	.040	.05	1,599
The period	.....	.....	.....	.....	1.21	41,541
1916.						
March 19–31	1,400	162	627	.968	.47	16,163
April	524	51	196	.302	.34	11,663
May	480	46	130	.201	.23	7,993
June	531	76.3	229	.353	.39	13,626
July	363	38.7	86	.133	.15	5,288
August	107.7	33.4	50	.077	.09	3,074
September	46	30	34	.052	.06	2,023
October	93	46	68	.105	.12	4,181
The period	.....	.....	.....	.....	1.85	64,011

NOTE.—Discharge of approximately 50 second-feet per day continued during first part of November in 1916. These tables show total discharge of the river and Strong's ditch at the point. In 1916 records for this ditch are incomplete, and they were affected by operations of beavers.

Area used in computing these tables is the same as published in the Canadian hydrometric reports which was changed from time to time as more definite information of the drainage basin was obtained.

Duration of flow (number of days in the year) of Frenchman River at Eastend, Sask., 1909–1916, and Phillip's ranch, 1917.

Flow (second-feet).	1909	1910	1911	1912	1913	1914	1915	1916	1917	Total.	Average.
4,000	.....	.....	.....	.....	.....	.....	.....	.....	1	1	.....
3,000	.....	.....	.....	.....	.....	.....	.....	.....	3	3	.....
2,000	.....	.....	.....	.....	.....	.....	2	.....	4	6	.....
1,500	1	.....	.....	.....	.....	.....	2	.....	12	15	1
1,400	1	.....	.....	1	.....	.....	3	1	14	20	2
1,300	2	.....	.....	1	.....	.....	3	1	18	25	2
1,200	2	.....	.....	1	.....	.....	3	1	22	29	3
1,100	2	.....	.....	1	2	.....	3	2	25	35	4
1,000	2	.....	.....	1	2	.....	3	3	27	38	4
900	4	.....	.....	1	2	.....	4	4	31	46	5
800	5	.....	.....	2	4	2	4	4	33	54	6
700	7	.....	.....	3	5	2	4	5	34	60	7
600	8	.....	.....	6	9	3	4	7	36	73	8
500	11	.....	.....	7	11	6	5	9	37	86	9
450	13	.....	.....	7	12	7	5	16	37	97	12
400	13	.....	.....	10	13	9	5	22	37	109	10
350	19	.....	.....	11	13	11	5	27	39	125	14
300	21	.....	.....	14	14	13	6	30	40	138	15
250	31	.....	.....	22	15	15	7	36	42	168	18
200	40	.....	.....	32	15	16	9	40	49	201	22
150	56	.....	.....	36	16	18	15	57	54	252	28
100	69	.....	3	50	28	21	32	74	68	345	38
90	71	.....	12	54	32	21	39	82	69	380	42
80	77	.....	20	59	35	24	55	97	70	435	48
70	80	.....	30	61	42	26	74	109	73	495	55
60	87	2	39	63	54	27	92	135	79	578	64
50	94	8	55	67	68	28	105	164	90	679	75
40	116	31	72	73	71	37	123	194	97	814	90
30	134	39	103	109	79	89	142	228	103	1,026	114
20	165	65	155	169	97	125	215	228	139	1,358	151
10	194	101	181	217	142	153	230	230	214	1,662	185
9	194	120	183	217	142	155	230	230	214	1,685	187
8	194	133	183	217	142	158	230	230	214	1,701	189
7	194	147	184	217	142	168	230	230	214	1,726	192
6	194	152	184	217	142	168	230	230	214	1,731	192
5	194	161	184	217	142	174	230	230	214	1,746	194
4	194	170	184	217	142	180	230	230	214	1,761	196
3	194	173	184	217	142	216	230	230	214	1,800	200
2	194	184	184	217	142	231	230	230	214	1,826	203
1	194	191	184	217	142	235	230	230	214	1,837	204
0	194	197	184	217	142	235	230	230	214	1,843	205

FRENCHMAN RIVER AT 76 RANCH, SASK.

LOCATION.—In SE. ¼ sec. 27, T. 5, R. 16 W. third meridian, at 76 ranch, 15 miles northeast of Waldeville and 22 miles south of Admiral, Sask.

DRAINAGE AREA.—1,106 square miles.

RECORDS AVAILABLE.—Incomplete records April 10, 1914, to November 11, 1916; complete records 1917, during open water period.

GAGE.—Vertical staff; read by G. P. Nash and J. M. Nash.

DISCHARGE MEASUREMENTS.—Made from cable or by wading.

CHANNEL AND CONTROL.—Bed clay; permanent. Left bank steep; subject to overflow; right bank not subject to overflow. Control gravel; not permanent.

EXTREMES OF DISCHARGE.—1914–1917: Maximum stage recorded, 10.90 feet July 3, 1916 (discharge 2,412 second-feet); no flow August 18 to August 23, 1914.

ICE.—Stage-discharge relation affected by ice during period of spring run-off and during late autumn. Observations discontinued during winter.

DIVERSIONS.—There are a large number of small irrigation systems on this stream and its tributaries above this station.

ACCURACY.—Stage-discharge relation not permanent. Gage read twice daily to hundredths throughout open-water season. No measurements taken above gage height 4.32 feet. Records for April and May, 1917, are approximate. Daily discharge ascertained by applying mean daily gage heights to rating table, or when stage discharge relation is affected by ice, estimated. Records fair.

Discharge measurements of Frenchman River at 76 ranch, Sask., 1914–1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*	1915.		*Feet.*	*Sec.-ft.*
Apr. 11	E. W. W. Hughes	4.92	378.0	Sept. 17	F. R. Steinberger	2.17	31
11	do	4.97	485.0	30	do	2.11	21
12	do	5.04	560.0	Oct. 3	do	2.21	31
17	do	4.32	418.0	9	do	2.19	30
May 13	E. W. W. Hughes	2.66	70.0				
15	do	2.80	69.0	1916.			
July 20	do	1.46	2.1	Apr. 25	J. E. Caughey	3.36	180
Oct. 23	do	2.00	17.4	May 17	do	2.83	104
				June 2	do	4.13	381
1915.				17	do	3.43	219
May 10	F. R. Steinberger	2.10	24	27	do	3.53	221
19	do	2.45	59	Aug. 5	L. B. P. Miles	2.70	86
21	do	2.55	78	6	do	2.59	83
25	do	2.28	40	17	do	2.53	73
June 1	do	2.42	58	Sept. 9	do	2.27	37
23	do	2.54	74	20	do	2.20	33
24	do	2.82	129	Nov. 13	do	2.56	[a] 37
28	do	2.37	51				
July 3	do	2.37	52	1917.			
26	do	2.48	65	May 29	P. R. Fetterly	3.36	199.0
29	do	2.39	54	July 6	do	2.48	65.0
Aug. 20	do	2.08	23	Aug. 10	do	1.92	15.2
26	do	2.13	28	Oct. 9	do	1.99	19.2
				Nov. 25	do	1.89	12.6

[a] Ice present.

Daily discharge, in second-feet, of Frenchman River at 76 ranch, Sask., 1914–1917.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1914.									
1				13.0	[a] 9.50	0.70	0.40	5.3	
2				9.5	[a] 9.50	.73	.36	5.1	
3				13.0	9.50	.70	.34	5.8	
4				13.0	9.80	.58	.34	8.0	
5				17.0	8.00	.58	.28	9.2	
6				48.0	6.80	.55	.20	11.0	
7				107.0	8.90	.49	.20	21.0	
8				74.0	4.50	.49	.22	11.4	
9				27.0	2.80	.43	.14	13.0	
10		741		50.0	2.40	.38	.12	21.0	
11		699		36.0	2.80	.34	.14	27.0	
12		800		27.0	2.80	.34	.20	27.0	
13		489	65	30.0	2.20	.34	.40	24.0	
14		452	87	33.0	1.82	.32	6.80	23.0	
15		699	57	33.0	2.80	.32	6.20	19.0	
16		606	45	30.0	2.40	.32	3.50	17.8	
17		433	59	21.0	1.20	.30	6.80	17.4	
18		382	49	13.0	1.45	0	6.50	17.0	
19		301	45	11.0	1.45	0	13.00	14.6	
20		247	41	8.9	2.90	0	13.40	13.8	
21		194	34	6.8	1.70	0	12.20	11.8	
22			33	6.8	1.65	0	11.40	10.1	
23			32	6.8	1.00	0	13.00	15.0	
24			31	8.0	1.04	.55	11.40	15.0	
25			28	9.5	.94	.55	9.50	13.8	
26			26	6.8	1.00	.10	7.80	12.2	
27			26	9.5	1.08	.30	6.20	11.4	
28			25	13.0	1.08	.30	6.20	11.4	
29			25	9.5	1.04	0	5.50	11.8	
30			25	9.5	.94	.10	5.30	12.6	
31			25		.85	.10		13.0	

[a] Interpolated.

Daily discharge, in second-feet, of Frenchman River at 76 ranch, Sask., 1914–1917— Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1915.									
1	.....	34	98	55	41	53	.....	22	.....
2	.....	392	87	53	40	50	.....	22	22
3	.....	455	64	104	39	53	.....	30	.....
4	.....	284	66	68	40	56	.....	30	.....
5	.....	1,437	65	104	40	29	.....	a 30	.....
6	.....	1,343	56	379	30	26	.....	30	.....
7	.....	1,778	37	352	39	22	.....	29	.....
8	.....	803	22	213	40	33	.....	29	.....
9	.....	625	22	147	40	31	.....	29	.....
10	.....	339	22	104	52	30	.....	30	.....
11	.....	276	22	68	85	28	22	30	.....
12	.....	276	.....	85	68	24	24	.....	.....
13	.....	a 241	.....	68	73	21	22	.....	.....
14	.....	206	.....	53	104	20	a 24	.....	.....
15	.....	194	.....	40	104	20	a 26	.....	.....
16	.....	158	.....	30	80	20	26	.....	.....
17	.....	132	.....	28	104	20	28	.....	.....
18	.....	125	46	28	68	20	28	.....	.....
19	.....	114	59	40	73	23	.....	.....	.....
20	.....	136	62	39	68	24	.....	.....	.....
21	.....	138	75	36	78	22	.....	.....	.....
22	.....	110	a 65	45	98	21	.....	.....	.....
23	.....	104	a 56	53	96	22	.....	.....	.....
24	17.2	95	45	129	78	22	.....	.....	.....
25	19.8	85	38	104	68	22	.....	.....	.....
26	36.0	68	45	108	62	25	.....	.....	.....
27	12.5	46	41	73	68	25	.....	.....	.....
28	26.0	66	a 43	68	56	25	.....	.....	.....
29	49.0	65	a 44	45	58	a 24	.....	.....	.....
30	39.0	64	45	46	50	a 24	23	.....	.....
31	29.0	.....	39	.....	56	a 24	.....	.....	.....
1916.									
1	.....	.....	156	420	180	133	b 38.0	34	61
2	.....	.....	176	366	189	130	b 38.0	43	61
3	.....	.....	159	282	2,412	124	b 38.0	52	61
4	.....	.....	143	229	738	122	b 37.0	51	61
5	.....	.....	130	187	205	90	b 37.0	81	58
6	.....	.....	130	185	387	84	b 37.0	78	57
7	.....	.....	143	160	372	80	b 37.0	68	56
8	.....	.....	143	141	213	79	37.0	64	56
9	.....	.....	130	243	164	136	39.0	62	57
10	.....	.....	122	325	115	128	43.0	61	57
11	.....	.....	130	223	101	86	43.0	64	58
12	.....	.....	149	171	98	79	41.0	79	.....
13	.....	.....	130	146	87	80	41.0	84	.....
14	.....	.....	108	227	87	75	40.0	84	.....
15	.....	.....	111	390	81	72	39.0	84	.....
16	.....	.....	104	292	74	72	36.0	88	.....
17	.....	.....	104	211	68	69	35.0	94	.....
18	.....	.....	101	180	62	63	34.0	94	.....
19	.....	.....	93	146	217	62	34.0	93	.....
20	.....	.....	91	127	314	61	34.0	84	.....
21	.....	.....	84	104	171	51	32.0	79	.....
22	.....	.....	88	107	51	42	32.0	78	.....
23	.....	.....	83	109	51	40	32.0	74	.....
24	.....	.....	68	107	76	b 40	32.0	72	.....
25	.....	191	119	104	64	b 40	16.4	64	.....
26	.....	189	176	162	62	b 40	16.4	67	.....
27	.....	180	180	215	62	b 39	33.0	67	.....
28	.....	162	189	195	56	b 39	34.0	66	.....
29	.....	152	282	180	104	b 39	34.0	66	.....
30	.....	146	396	180	55	b 39	34.0	64	.....
31	.....	.....	402	.....	292	b 38	.....	62	.....

a Interpolated. b Estimated.

Daily discharge, in second-feet, of Frenchman River at 76 ranch, Sask., 1914–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1917.									
1		5	938	164	68.0	16.5	11.0	34.0	41
2		25	948	167	67.0	15.1	10.6	32.0	39
3		40	942	176	66.0	15.1	11.4	29.0	43
4		40	962	164	63.0	14.4	11.0	28.0	41
5		50	958	169	68.0	15.1	11.8	26.0	43
6		50	908	194	63.0	15.1	12.2	24.0	44
7		50	338	192	56.0	13.7	13.0	22.0	38
8		310	342	176	54.0	13.0	15.8	22.0	33
9		570	388	162	53.0	13.7	18.6	22.0	39
10		830	205	159	52.0	13.7	20.0	21.0	41
11		1,082	720	157	50.0	13.7	22.0	17.9	34
12		1,168	762	152	47.0	15.1	22.0	17.9	42
13		1,242	948	146	44.0	15.8	22.0	18.6	30
14		1,552	910	149	44.0	15.1	24.0	19.3	33
15		1,232	862	164	42.0	15.1	29.0	21.0	28
16		1,282	808	164	41.0	14.4	29.0	21.0	30
17		1,362	768	152	39.0	14.4	26.0	34.0	38
18		1,558	762	136	36.0	13.0	24.0	26.0	52
19		2,078	760	130	33.0	15.8	22.0	18.6	50
20		1,358	758	116	32.0	16.5	21.0	34.0	56
21		1,298	752	103	30.0	31.0	21.0	18.6	46
22		1,340	750	101	28.0	23.0	19.3	24.0	48
23		1,712	748	101	26.0	20.0	17.9	29.0	49
24		1,800	745	97	25.0	17.9	24.0	26.0	45
25		1,952	740	94	24.0	13.7	26.0	34.0	22
26		1,642	600	85	24.0	13.0	26.0	46.0	33
27		1,005	460	83	22.0	12.2	25.0	44.0	61
28		1,030	321	83	22.0	12.2	22.0	30.0	50
29		1,028	194	78	21.0	11.4	27.0	35.0	43
30		1,008	194	72	19.3	11.0	39.0	44.0	51
31		.....	191	.....	17.9	10.6	.....	38.0	.....

NOTE.—1915: Gage heights not available May 12–17, Sept. 1–10, and Sept. 19–29.
1917: Stage-discharge relation affected by ice Apr. 1–10 and Oct. 17 to Nov. 30. Determinations of discharge for April and May roughly approximate as no measurements were made until May 29 and none have ever been made above gage height 4.32 feet. Backwater from ice raised water level 0.10 foot Oct. 17–31 and 0.05 foot Nov. 1–30.

Monthly discharge of Frenchman River at 76 ranch, Sask., 1914–1917.

[Drainage area, 1,106 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1914.						
April 10–21	800.00	194.00	504.00	0.4560	0.2030	11,983
May 13–31	87.00	25.00	40.00	.0360	.0250	1,503
June	107.00	6.80	23.40	.0210	.0230	1,393
July	9.80	.85	3.40	.0030	.0040	210
August	.73	.00	.32	.0003	.0004	20
September	13.40	.12	4.90	.0040	.0040	294
October	27.00	5.10	14.50	.0130	.0150	891
The period	.....	.....	.....	.....	.2744	16,294
1915.						
March 24–31	49	12.5	28	.025	.01	444
April	1,437	34.0	340	.307	.34	20,231
May 1–11 and 18–31	98	22.0	51	.046	.04	2,529
June	379	28.0	92	.083	.09	5,474
July	104	30.0	64	.058	.07	3,935
August	56	20.0	28	.025	.03	1,722
September 11–18 and 30	28	22.0	25	.023	.01	411
October 1–11	30	22.0	28	.025	.01	663
The period	.....	.....	.....	.....	.30	35,294

Monthly discharge of Frenchman River at 76 ranch, Sask., 1914–1917—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1916.						
April 25–30	191	146.0	170	0.154	0.03	2,023
May	402	68.0	149	.135	.16	9,162
June	420	104.0	204	.184	.21	12,139
July	2,412	51.0	233	.211	.24	14,327
August	136	38.0	73	.066	.08	4,489
September	43	16.4	35	.032	.04	2,083
October	94	34.0	71	.064	.07	4,366
November 1–11	61	56.0	58	.052	.02	1,265
The period	.....	.....	.....	.....	.85	49,854
1917.						
April	2,078	5.0	990.0	.895	1.00	58,909
May	1,388	191.0	796.0	.720	.83	48,944
June	194	72.0	136.0	.123	.14	8,093
July	68	17.9	41.0	.037	.04	2,521
August	31	10.6	15.2	.014	.02	935
September	39	10.6	21.0	.019	.02	1,250
October	46	17.9	28.0	.025	.03	1,722
November	61	22.0	41.0	.037	.04	2,440
The period	.....	.....	.....	.....	2.12	124,814

NOTE.—Records for April and May, 1917, are approximate.

Mean monthly discharge, in second-feet, of Frenchman River at 76 ranch, Sask., 1914–1917.

Year.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total in acre-feet.
1914	.....	[a] 504	[a] 40	23	3.4	0.32	4.90	14.50	.....	[a] 16,270
1915	[a] 28	340	[b] 47	92	64.0	28.00	[b] 30.00	[a] 28.00	.....	[a] 37,092
1916	.....	[a] 170	149	204	233.0	73.00	35.00	71.00	[a] 58	49,854
1917	.....	990	796	136	41.0	15.20	21.00	28.00	41	124,814
Average	.....	665	331	114	85	29	23	38	41	80,953
Average run-off, acre-feet	.....	39,570	20,352	6,783	5,226	1,783	1,369	2,337	2,440	79,860
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	72

[a] Incomplete record not included in average. [b] Estimated.

FRENCHMAN RIVER AT HUFF'S RANCH, SASK.

LOCATION.—In sec. 5, T. 5, R. 14 W. third meridian, 40 miles by trail from Notre Dame D'Auvergne post office, and 75 miles from Swift Current.

DRAINAGE AREA.—1,416 square miles.

RECORDS AVAILABLE.—May 22 to November 15, 1910; four discharge measurements in 1911.

GAGE.—Staff, graduated to feet and hundredths, fixed to post at left bank; read during 1910 by Roy Wright.

DISCHARGE MEASUREMENTS.—Made by wading. When stream is too deep for wading discharge is determined by slope method.

CHANNEL AND CONTROL.—Bed composed of quicksand; shifting control due to sand and beaver dams.

EXTREMES OF DISCHARGE.—Maximum stage recorded in 1910, 2.44 feet May 21–24 (discharge, 35.3 second-feet); minimum, channel reported dry July 26 to November 1.

ICE.—No observations. Station not maintained during winter.

ACCURACY.—Records fair.

Discharge measurements of Frenchman River at Huff's ranch, Sask., 1910–11.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1910.		*Feet.*	*Sec.-ft.*	1911.		*Feet.*	*Sec.-ft.*
May 23	F. H. Peters	2.44	35.27	June 15	N. M. Sutherland	2.16	24.46
July 13	R. G. Swan	1.775	3.05	July 11	do	2.20	25.94
Aug. 23	do		Dry.	July 28	do	1.81	7.09
				Aug. 13	do	2.05	5.06

Daily discharge, in second-feet, of Frenchman River at Huff's ranch, Sask., 1910.

Day.	May.	June.	July.	Nov.	Day.	May.	June.	July.	Nov.
1910.					1910.				
1		15.1	6.4		16		5.2	1.25	
2		12.0	5.7	2.3	17		5.0	.9	
3		12.5	4.4	3.5	18		5.0	.85	
4		11.5	4.4	1.05	19		5.9	.8	
5		11.1	4.6	5.2	20		6.7	.6	
6		10.2	4.2	5.9	21		5.45	.5	
7		9.5	3.35	7.3	22	35.3	6.2	.4	
8		8.35	3.05	6.2	23	35.3	6.4	.2	
9		7.6	3.05	4.6	24	35.3	6.4	.15	
10		6.7	4.4	7.9	25	34.7	6.4		
11		6.2	3.5	9.8	26	28.5	6.2	.0	
12		5.7	2.2	13.5	27	27.6	6.2	(a)	
13		5.2	2.55	19.2	28	26.1	5.45		
14		5.2	2.2	19.2	29	26.1	6.7		
15		5.2	1.8	16.8	30	19.9	6.4		
					31	16.8			

a River dry from July 26 to Nov. 1.

Monthly discharge of Frenchman River at Huff's ranch, Sask., 1910.

[Drainage area, 1,416 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1910.						
May 22-31	35.3	16.8	28.56	0.020	0.007	566
June	15.1	5.0	7.42	.005	.006	441
July 1-26	6.4	.0	2.37	.002	.002	123
November 1-15	19.2	1.05	8.74	.006	.003	244
The period						1,373

FRENCHMAN RIVER AT BUZZARD'S RANCH, SASK.

LOCATION.—In the NW. ¼ sec. 3, T. 2, R. 11 W. third meridian, at William Buzzard's ranch, near Coriander post office, below the mouth of Bigbreed Creek.

DRAINAGE AREA.—1,778 square miles.

RECORDS AVAILABLE.—March 27, 1914, to October 25, 1915.

GAGE.—Vertical staff fastened to post on left bank about half a mile upstream from Mr. Buzzard's house; read by George A. Brown and A. Hendrix.

DISCHARGE MEASUREMENTS.—Made by wading or from cable.

CHANNEL AND CONTROL.—Probably permanent.

EXTREMES OF DISCHARGE.—1914–15; maximum stage recorded, 11.70 feet April 10, 1915 (discharge, 1,578 second-feet); no flow August 9–24 and September 10–13, 1914.

ICE.—Stage-discharge relation affected by ice at time of spring break-up. Station not maintained during the winter.

ACCURACY.—Records fair.

Discharge measurements of Frenchman River at Buzzard's ranch, Sask., 1914–15.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*	1915.		*Feet.*	*Sec.-ft.*
Mar. 28	E. W. W. Hughes	1.36	[a] 68.0	Mar. 31	F. R. Steinberger	5.41	442.0
Apr. 1	do	2.18	[a] 117.0	Apr. 1	do	5.76	502.0
1	do	2.54	[a] 139.0	3	do	7.50	920.0
2	do	2.30	[a] 131.0	5	do	9.53	1,122.0
26	do	1.05	110.0	6	do	8.34	923.0
May 4	do	.88	71.0	7	do	9.08	1,092.0
20	do	.79	49.0	8	do	10.24	1,287.0
June 8	do	.60	18.9	9	do	11.04	1,444.0
10	do	.61	22.0	10	do	11.70	1,578.0
13	do	2.48	348.0	12	do	3.59	478.0
27	do	.60	19.0	20	do	1.38	149.0
July 3	do	.69	15.6	28	do	.95	79.0
28	do	.10	[b] .3	30	do	.83	58.0
Oct. 26	do	.54	17.4	June 7	do	1.04	107.0
1915.				15	do	.88	67.0
Mar. 20	F. R. Steinberger	.56	3.9	July 10	do	.76	49.0
22	do	.71	6.2	21	do	1.00	101.0
23	do	1.31	84.0	Aug. 4	do	.79	57.0
24	do	3.81	204.0	13	do	.69	31.0
25	do	3.71	198.0	31	do	.60	21.0
26	do	5.89	406.0	Sept. 8	do	.55	17.8
29	do	4.74	341.0	21	do	.65	26.0
30	do	4.75	364.0	Oct. 14	do	.66	27.0
				25	do	.65	26.0

[a] Ice present.

[b] Estimated.

Daily discharge, in second-feet, of Frenchman River at Buzzard's ranch, Sask., 1914–15.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1914.								
1	.....	128	76	20	[a] 18.00	0.55	0.34	6.1
2	.....	131	74	19	[a] 18.00	1.70	.03	5.3
3	.....	146	69	18	[a] 17.10	1.70	.03	4.5
4	.....	515	60	18	[a] 17.10	.90	.03	3.3
5	.....	688	60	19	16.20	.50	.03	2.5
6	.....	947	60	19	16.20	.30	.03	35.0
7	.....	1,172	58	32	15.30	.03	.03	58.0
8	.....	708	55	28	13.50	.06	.03	51.0
9	.....	614	53	23	12.70	0	.03	36.0
10	.....	757	51	24	8.30	0	0	40.0
11	.....	994	55	28	7.10	0	0	43.0
12	.....	1,014	56	33	6.50	0	0	51.0
13	.....	888	58	393	6.10	0	0	53.0
14	.....	866	58	267	4.90	0	55.00	49.0
15	.....	478	62	67	4.10	0	7.70	45.0
16	.....	798	71	42	3.70	0	2.50	43.0
17	.....	992	69	39	2.90	0	.75	43.0
18	.....	710	60	36	2.50	0	.60	39.0
19	.....	577	60	35	2.10	0	.50	36.0
20	.....	460	49	28	1.70	0	.30	36.0
21	.....	370	48	27	1.35	0	.06	35.0
22	.....	274	43	24	1.20	0	.30	32.0
23	.....	218	42	22	.60	0	.42	29.0
24	.....	235	37	21	.34	0	23.00	25.0
25	.....	208	32	33	.30	39.00	18.00	21.0
26	.....	96	32	60	.30	17.10	16.20	19.0
27	95	87	30	23	.30	39.00	13.50	17.1
28	68	78	27	22	.34	4.50	11.10	17.1
29	44	78	24	20	.30	3.30	8.30	16.2
30	53	76	23	19	.30	2.50	7.10	16.2
31	97	.....	22	.....	.34	.75	.....	15.3

[a] Estimated.

NOTE.—1914: Stage-discharge relation affected by ice Mar. 27 to Apr. 14.

Daily discharge, in second-feet, of Frenchman River at Buzzard's ranch, Sask., 1914–1915—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1915.								
1	.....	502	50	49	a 61	a 56	a 21.0	a 26
2	.....	590	59	79	a 59	a 55	a 19.8	a 26
3	.....	920	65	a 64	a 57	a 53	a 19.2	a 26
4	.....	1,000	65	a 59	a 56	57	a 19.2	a 26
5	.....	1,122	69	a 70	a 55	a 49	a 18.6	a 26
6	.....	923	73	a 81	a 53	a 46	a 18.6	a 26
7	.....	1,092	57	107	a 52	a 44	a 18.0	a 26
8	.....	1,287	50	a 87	a 50	a 42	18.0	a 26
9	.....	1,444	50	a 84	a 49	a 41	a 18.6	a 26
10	.....	1,578	37	a 81	49	a 40	a 18.6	a 26
11	.....	738	42	a 78	a 50	a 36	a 19.2	a 26
12	.....	478	34	a 75	a 53	a 34	a 19.2	a 26
13	.....	601	34	a 71	a 56	31	a 19.8	a 26
14	.....	418	58	a 69	a 59	a 28	a 19.8	27
15	.....	388	81	67	a 62	a 28	a 21.0	a 27
16	.....	205	50	a 50	a 65	a 28	a 21.0	a 27
17	.....	175	65	a 35	a 69	a 27	a 22.0	a 27
18	.....	160	67	a 19	a 72	a 27	a 23.0	a 27
19	.....	160	50	a 9	a 75	a 26	a 24.0	a 27
20	3.9	149	80	3	a 79	a 26	a 25.0	a 27
21	5.0	141	65	190	104	a 25	26.0	a 27
22	6.2	111	50	84	a 81	a 25	a 26.0	a 27
23	84.0	126	730	a 81	a 78	a 24	a 26.0	a 27
24	204.0	141	658	a 78	a 75	a 24	a 26.0	a 27
25	198.0	111	a 582	a 75	a 72	a 23	a 26.0	26
26	406.0	95	a 505	a 71	a 69	a 23	a 26.0	.....
27	385.0	81	a 430	a 69	a 65	a 22	a 26.0	.....
28	365.0	79	a 354	a 65	a 62	a 22	a 26.0	.....
29	341.0	a 65	a 278	a 64	a 61	a 21	a 26.0	.....
30	364.0	58	a 202	a 63	a 59	a 21	a 26.0	.....
31	442.0	.....	a 126	.....	a 57	21	.....	.....

a Estimated.

Monthly discharge of Frenchman River at Buzzard's ranch, Sask., 1914–15.

[Drainage area, 1,778 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1914.						
March 27–31	97	44.00	71.0	0.040	0.007	708
April	1,172	76.00	510.0	.287	.320	30,347
May	76	22.00	51.0	.028	.032	3,124
June	393	18.00	49.0	.027	.030	2,892
July	18	.30	6.4	.004	.005	396
August	39	.00	3.6	.002	.002	222
September	55	.00	5.5	.003	.003	329
October	58	2.50	30.0	.017	.020	1,833
The period	.....	.....	.....	.....	.419	39,851
1915.						
March 20–31	442	3.9	234	.132	.06	5,568
April	1,578	58.0	498	.280	.31	29,633
May	730	34.0	165	.093	.11	10,145
June	190	3.0	69	.039	.04	4,106
July	104	49.0	63	.035	.04	3,874
August	57	21.0	33	.019	.02	2,029
September	26	18.0	22	.012	.01	1,309
October 1–25	27	26.0	26	.015	.01	1,290
The period	.....	.....	.....	.....	.60	57,954

FRENCHMAN RIVER AT MARTIN'S RANCH, SASK.

LOCATION.—In NW. ¼ sec. 24, T. 1, R. 11 W. third meridian, about 4 miles above the international boundary.

DRAINAGE AREA.—1,826 square miles.

RECORDS AVAILABLE.—Two discharge measurements only in 1915; complete records from May 14 to October 31, 1916. Open-water flow at Buzzard's ranch (p. 363), March 27, 1914, to October 25, 1915.

GAGE.—Vertical staff on right bank just above trail crossing.

DISCHARGE MEASUREMENTS.—Made by wading at crossing below gage or from cable at Buzzard's ranch at high stages.

CHANNEL AND CONTROL.—Bed, gravel; clean. Banks high, wooded, and steep; right bank subject to overflow. One channel at all stages. Control shifts at high stages.

EXTREMES OF DISCHARGE.—During 1916 maximum discharge was 5,223 second-feet March 30, 1916; minimum stage, 1.00 foot on September 22 and October 15, 1915. (discharge, 26 second-feet). (See hydrograph Pl. XXVI.)

ICE.—Station not maintained during winter.

DIVERSIONS.—Numerous diversions for irrigation above station.

ACCURACY.—Stage-discharge relation practically permanent except during periods of spring break up and flood stages. Gage read to hundredths daily. Determinations of daily discharge during spring break up in 1916 based on discharge measurements and observations of flow taken at Buzzard's ranch (p. 363); daily discharge for other periods obtained by applying daily gage height to rating table. Records fair.

This station was established on September 22, 1915, to take the place of the station at Buzzard's ranch, where an observer could not be obtained. During the spring break up in 1916 the engineer made discharge measurements and observations at Buzzard's ranch because there is no cable at Martin's. The flow at this station was determined by adding the flow of Littlebreed Creek and an allowance for local run-off to the flow at Buzzard's ranch.

Discharge measurements of Frenchman River at Martin's ranch, Sask., 1915–16.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
Sept. 22	G. H. Whyte and F. R. Steinberger	1.00	26	Apr. 11	J. E. Caughey	12.46	[b] 1,596
				12	do	13.35	[b] 1,928
Oct. 15	F. R. Steinberger	1.00	26	13	do	12.94	[b] 1,759
				14	do	11.51	[b] 1,426
1916.				17	do	7.21	[b] 818
Mar. 19	J. E. Caughey	[a] 3.92	237	21	do	3.01	[b] 359
21	do	9.63	[b] 1,007	May 22	do	1.61	100
22	do	11.40	[b] 1,592	June 20	do	2.32	191
24	do	11.44	[b] 1,300	Aug. 13	L. B. P. Miles	1.50	87
25	do	12.21	[b] 1,308	Sept. 12	do	1.13	42
27	do	11.93	[b] 1,369	15	do	1.15	39
Apr. 4	do	13.98	[b] 2,436	Nov. 25	do	[a] 1.30	42
5	do	12.68	[b] 1,694	27	do	[a] .74	[b] 40
7	do	6.34	[b] 799				

[a] Ice condition.

[b] Discharge measured and gage read at old gaging station at Buzzard's ranch on NW. ¼ sec. 3, T. 2, R. 11 W. third meridian, and does not include the flow of Littlebreed Creek or local run-off.

Daily discharge, in second-feet, of Frenchman River at Martin's ranch, Sask., 1916.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1	.....	4,424	171	592	654	151	45	40
2	.....	3,754	165	594	592	283	42	41
3	.....	3,495	165	566	558	242	42	44
4	.....	2,515	186	486	1,090	187	42	46
5	.....	1,756	186	399	a 1,190	164	45	48
6	.....	1,051	162	323	a 1,390	129	44	60
7	.....	846	147	273	a 1,270	108	44	74
8	.....	703	140	237	842	94	43	70
9	.....	800	137	202	a 1,130	82	52	66
10	.....	1,392	140	240	a 1,290	76	56	67
11	.....	1,976	136	333	a 1,170	82	50	64
12	.....	2,286	136	586	772	78	45	64
13	.....	2,450	136	339	285	81	46	63
14	100	2,142	150	231	193	74	45	64
15	20 (	1,958	130	199	188	67	45	74
16	300	1,818	123	237	140	64	45	76
17	300	1,304	117	435	124	62	45	76
18	250	942	115	416	204	66	44	78
19	237	790	106	280	276	65	44	80
20	700	710	106	199	232	62	42	85
21	1,007	590	100	161	260	58	41	85
22	1,597	414	52	151	194	55	40	84
23	1,485	369	91	210	127	54	39	78
24	1,396	341	90	158	108	50	39	72
25	1,371	288	323	158	94	48	39	67
26	1,625	255	578	133	88	48	40	69
27	1,733	239	622	119	133	50	40	64
28	3,845	215	646	137	97	45	40	65
29	4,172	202	427	344	244	47	40	65
30	5,223	192	370	794	738	46	41	64
31	4,734	.....	450	.....	202	45	.....	64

a Estimated.

NOTE.—Discharge estimated from observations and measurements made by engineer in field at the time.

Monthly discharge of Frenchman River at Martin's ranch, Sask., 1916.

[Drainage area, 1,826 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
March 14–31	5,223	100	1,682	0.921	0.62	60,035
April	4,424	192	1,341	.735	.82	79,799
May	646	64	214	.117	.13	13,097
June	794	119	318	.174	.19	18,922
July	1,390	88	512	.280	.32	31,482
August	283	45	89	.049	.06	5,472
September	56	39	44	.024	.03	2,618
October	85	40	66	.036	.04	4,058
The period	.....	.....	.....	.....	2.21	215,483

NOTE.—Area revised since publishing Canadian records for 1916.

FRENCHMAN RIVER AT INTERNATIONAL BOUNDARY.

LOCATION.—In SW. ¼ sec. 4, T. 1, R. 10 W. third meridian, about 60 miles south of Aneroid, Sask., and 48 miles north of Saco, Mont., near Greve post office, Mont.

DRAINAGE AREAS.—1,885 square miles.

RECORDS AVAILABLE.—April 1 to November 30, 1917.

GAGE.—Stevens continuous water-stage recorder with staff gages inside and outside. All gages are maintained at elevation of 2,420.85 feet (U. S. Geological Survey datum) above sea level. Observer, Mrs. W. B. Chamberlin.

DISCHARGE MEASUREMENTS.—Made from cable or by wading 200 feet below the cable.

CHANNEL AND CONTROL.—Bed composed of clay. Banks covered with brush; subject to overflow during high stages. There are two controls—one for stages below gage height 4.30 feet, the other for stages between 4.30 feet and 6.00 feet; both permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 9.94 feet on April 30 (discharge, 2,770 second-feet); minimum discharge recorded, 5.2 second-feet March 27.

ICE.—From April 1 to April 15, the presence of ice affected the stage-discharge relation. No winter records taken. Average winter flow estimated as 5.0 second-feet.

DIVERSIONS.—There are a large number of small irrigation projects diverting water from this stream and its tributaries above this station.

ACCURACY.—Stage-discharge relation permanent. Gage read twice a week to check the water-stage recorder. Rating curve based on 42 measurements taken during 1917. Records for ice period based on daily discharge measurements. Daily discharge April 12 to September 30, 1917, obtained by applying mean daily gage heights to standard rating table. Records good.

COOPERATION.—This station is maintained and operated jointly by the United States Geological Survey and the Reclamation Service, Department of Interior, Canada.

Discharge measurements of Frenchman River at international boundary, 1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 26	P. A. Fetterley	.....	[a] 5.6	Apr. 25	Anderson and Fetterley	9.28	2,480.0
27	....do	.....	[a] 5.2	28	P. A. Fetterley	9.18	2,440.0
30	....do	3.70	[a] 45.0	30	....do	9.94	2,770.0
31	....do	3.82	[a] 37.0	May 1	....do	8.62	2,240.0
Apr. 2	....do	3.59	[a] 28.0	2	....do	7.54	1,910.0
4	....do	3.48	[a] 36.0	3	....do	6.88	[b] 1,660.0
5	....do	3.48	[a] 48.0	4	....do	6.56	1,440.0
6	....do	3.88	[a] 155.0	5	....do	6.15	1,330.0
7	....do	4.52	[c] 333.0	6	....do	5.87	1,220.0
8	....do	4.32	[c] 438.0	11	....do	6.19	1,330.0
9	....do	4.97	[c] 788.0	18	A. H. Tuttle	5.22	969.0
10	....do	6.48	[c] 1,370.0	19	P. A. Fetterley	4.72	844.0
11	....do	7.87	[c] 2,070.0	19	....do	5.02	849.0
12	....do	8.32	2,130.0	23	....do	4.26	588.0
13	....do	8.08	2,060.0	24	....do	4.03	485.0
14	....do	9.18	2,450.0	25	....do	3.85	392.0
16	....do	8.88	2,300.0	31	A. H. Tuttle	3.54	274.0
18	....do	7.96	1,980.0	July 11	P. A. Fetterley	2.78	62.0
19	....do	7.48	1,800.0	Aug. 15	....do	2.30	13.8
20	....do	7.06	1,640.0	Oct. 14	....do	2.53	19.2
21	....do	6.74	1,540.0	25	....do	2.51	18.7
23	....do	8.56	2,210.0	Nov. 17	B. E. Jones	2.66	40.0
24	....do	9.97	2,760.0	28	P. A. Fetterley	2.66	41.0

[a] Ice conditions. [b] This result appears to be high through inaccurate soundings. [c] Ice going out.

NOTE.—A. H. Tuttle and B. E. Jones are engineers in the service of the United States Geological Survey.

Daily discharge, in second-feet, of Frenchman River at international boundary, 1917.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	a 30	2,210	234	55	19.0	18.0	48	15
2	28	1,790	234	47	18.0	19.0	a 46	20
3	a 30	1,580	234	42	18.0	19.0	a 44	a 20
4	36	1,440	234	55	18.0	19.0	a 44	a 20
5	48	1,300	214	78	18.0	19.0	a 43	a 20
6	155	1,200	203	91	18.0	18.0	a 41	a 35
7	333	a 1,240	190	87	18.0	18.0	a 39	a 35
8	438	a 1,280	184	81	18.0	18.0	37	a 35
9	788	a 1,320	217	76	17.0	18.0	30	a 35
10	1,370	1,370	210	64	16.0	18.0	27	a 35
11	2,070	1,330	190	61	16.0	18.0	24	a 40
12	2,080	1,360	181	59	16.0	19.0	23	a 40
13	2,130	1,450	165	55	16.0	24.0	24	a 40
14	2,440	1,500	165	47	15.0	27.0	22	a 40
15	2,420	1,290	162	46	16.0	54.0	24	a 40
16	2,360	1,120	147	55	16.0	63.0	20	a 43
17	2,140	1,070	147	54	17.0	42 0	20	43
18	1,990	962	181	49	17.0	34.0	20	44
19	1,810	834	178	46	18.0	34.0	24	27
20	1,620	710	150	40	19.0	33.0	24	35
21	1,540	656	133	36	18.0	33.0	22	30
22	1,690	648	125	34	19.0	33.0	20	35
23	2,140	571	103	32	18.0	29.0	20	35
24	2,720	478	100	31	17.0	38.0	15	35
25	2,520	410	98	29	18.0	29.0	27	35
26	2,340	356	91	28	23.0	25.0	24	40
27	2,330	325	87	25	24.0	18.0	16	42
28	2,480	310	76	24	22.0	19.0	22	35
29	2,700	284	64	23	19.0	25.0	29	35
30	2,670	281	57	21	19.0	22.0	22	30
31	.....	252	.....	20	18.0	.....	17	.....

a Estimated.

NOTE.—Stage-discharge relation affected by ice Apr. 1–15 and Nov. 23–30. Ice going out Apr. 7–11. Records from water-stage recorder used Apr. 12 to May 6 and May 10 to Sept. 30.

Monthly discharge of Frenchman River at international boundary, 1917.

[Drainage area, 1,885 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
April	2,720	28.0	1,582.0	0.839	0.94	94,135
May	2,210	252.0	998.0	.529	.61	61,365
June	234	57.0	158.0	.084	.09	9,402
July	91	20.0	48.0	.025	.03	2,951
August	24	15.0	18.0	.010	.01	1,107
September	63	18.0	26.0	.014	.02	1,547
October	48	15.0	28.0	.015	.02	1,722
November	44	15.0	34.0	.018	.02	2,023
The period	.....	.....	.....	.....	1.74	174,252

Mean monthly discharge, in second-feet, of Frenchman River at international boundary, 1914–1917.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Total in acre-feet.
1914	(a)	522	51	51	6.4	3.7	5.6	30	40,698
1915	b 100	510	167	70	63.0	33.0	22.0	c 26	59,740
1916	b 980	1,341	214	318	512.0	89.0	44.0	66	215,767
1917	.....	1,582	998	158	48.0	18.0	26.0	.....	170,507
Average	540	939	358	149	157	36	24	41	121,678
Average run-off, acre-feet	33,203	58,850	22,013	8,866	9,654	2,214	1,428	2,521	138,749
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	74

[a] Incomplete record not included in average.
[b] Estimated.
[c] Average for part of month assumed as monthly average.

NOTE.—Records for 1914 and 1915 at Buzzard's ranch (including Littlebreed Creek) and for 1916 at Martin's ranch. Records published in 1915 report for Littlebreed Creek have been revised.

Duration of flow (number of days in the year) of Frenchman River at Buzzard's ranch, Martin's ranch, and international boundary, 1914–1917.

Flow (second-feet).	1914	1915	1916	1917	Total.	Average.
5,000	.....	.....	1	.....	1	.....
4,000	.....	.....	4	.....	4	1
3,000	.....	.....	7	.....	7	2
2,000	.....	.....	11	16	27	7
1,500	.....	1	18	24	43	11
1,400	.....	2	19	26	47	12
1,300	.....	2	24	32	58	14
1,200	.....	3	26	36	65	16
1,100	1	4	29	37	71	18
1,000	2	6	32	38	78	19
900	4	8	33	39	84	21
800	7	8	36	40	91	23
700	11	10	43	42	106	26
600	13	12	46	44	115	29
500	15	16	54	45	130	32
450	17	17	56	46	136	34
400	17	21	60	48	146	36
350	19	26	63	49	157	39
300	19	27	71	51	168	42
250	21	28	80	54	183	46
200	24	31	96	62	213	53
150	24	36	116	73	249	62
100	27	45	141	79	292	73
90	30	46	147	82	305	76
80	31	57	155	85	328	82
70	37	73	166	89	365	91
60	48	95	186	92	421	105
50	62	124	199	100	485	121
40	74	134	229	124	561	140
30	93	141	232	153	619	155
20	114	201	232	196	743	186
10	140	215	232	242	829	207
9	140	216	232	242	830	207
8	142	216	232	242	832	208
7	145	216	232	242	835	209
6	148	216	232	242	838	209
5	149	216	232	242	839	210
4	153	216	232	242	843	211
3	156	216	232	242	846	211
2	162	216	232	242	852	213
1	167	216	232	242	857	214
0	198	216	232	242	878	219

OXARART CREEK AT WYLIE'S RANCH, SASK.

LOCATION.—In SE. ¼ sec. 29, T. 6, R. 27 W. third meridian, at D. J. Wylie's ranch, 14 miles northwest of Consul, Sask., and about 3½ miles above where Oxarart Creek empties into Cypress Lake.

DRAINAGE AREA.—77 square miles.

RECORDS AVAILABLE.—April 21 to October 31, 1917. At old station downstream, opposite house in NE. ¼ sec. 20, T. 6, R. 27 W. third meridian, June 15, 1909, to April 21, 1917.

GAGE.—Vertical staff fastened to 5-inch post driven firmly into bed of creek and braced to right bank; read by Rachel M. Wylie.

DISCHARGE MEASUREMENTS.—Made from a log 900 feet below gage during flood stage, by wading 30 feet above gage during ordinary stage, or with weir near gage at low stages.

CHANNEL AND CONTROL.—Bed of creek composed of large stone and gravel. Banks fairly high; not subject to overflow. One channel at all stages. Control may shift during flood stages.

EXTREMES OF DISCHARGE.—1909–1917: Maximum stage recorded, 4 feet April 8, 1912 (discharge, 537 second-feet); no flow June 6–20 and September 2 to October 31, 1917.

ICE.—Station not maintained during winter season.

ACCURACY.—Stage-discharge relation practically permanent, except during ice and break-up period. Gage read to hundredths twice daily. Daily discharge obtained by applying mean daily gage height to rating table. Records fair.

Discharge measurements of Oxarart Creek at Wylie's ranch, Sask., 1909–1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1909.		*Feet.*	*Sec.-ft.*	1914.		*Feet.*	*Sec.-ft.*
May 27	H. R. Carscallen	.....	2.77	Mar. 28	H. R. Carscallen	0.75	0.45
June 15	do	.....	2.64	Apr. 10	do	1.18	7.10
30	do	.....	33.2	May 2	H. W. Rowley	.95	2.03
July 19	do	1.10	5.53	27	do	.95	2.25
Aug. 6	do	1.015	3.64	June 20	do	.93	1.70
Sept. 7	do	.86	1.99	July 10	do	.88	1.03
28	do	.81	1.45	Aug. 7	do	.85	.63
Nov. 23	do	.74	.70	Sept. 1	do	.86	.30
1910.				Oct. 1	do	.87	.42
Apr. 21	do	.97	2.44	Nov. 3	do	.88	.39
May 14	do	.96	2.17	1915.			
June 9	do	.89	1.51	Mar. 20	H. R. Carscallen	.81	.50
30	do	.85	.99	29	do	.92	1.10
July 22	do	.84	.71	Apr. 6	do	1.42	84.00
Aug. 9	do	.79	.67	7	do	1.36	71.00
Sept. 2	do	.79	.65	22	H. W. Rowley	.90	1.40
26	R. G. Swan	.80	.54	May 7	do	.95	2.10
Oct. 20	do	.78	.47	June 25	do	.92	1.61
1911.				Aug. 4	do	.90	1.46
Apr. 16	M. H. French	1.78	15.280	5	do	1.24	[c]1.45
May 9	do	1.06	2.460	Sept. 4	do	1.20	1.15
June 3	do	1.12	[a]2.064	22	do	1.17	.95
July 12	do	1.00	[a]1.354	1916.			
Aug. 3	do	.89	[a].986	Mar. 24	P. A. Fetterley	1.24	[d]12.40
26	do	.85	[a].738	25	do	1.81	[d]16.00
Sept. 21	do	.85	[a].748	Apr. 3	do	1.01	[d]11.40
Oct. 25	do	.85	[a].781	8	do	.93	[d] 4.10
1912.				12	do	1.36	[d]17.80
Apr. 9	do	3.45	354	28	H. W. Rowley	.70	[d] 4.20
24	do	1.26	18.2	May 12	do	.67	[d] 3.10
May 29	G. R. Elliott	1.10	14.2	June 1	do	1.04	[b]20.00
June 24	O. H. Hoover	.67	[b]2.73	27	do	.78	7.10
July 5	G. R. Elliott	.56	2.30	July 20	do	.68	[b]3.30
Aug. 13	do	.42	1.16	Aug. 12	do	.65	[b]2.80
Sept. 13	do	.39	1.19	31	do	.60	[b]2.20
Oct. 18	do	.38	[b].47	Sept. 27	V. A. Newhall and Rowley	.56	[b]1.26
Nov. 6	do	.40	[b].48	Nov. 13	H. W. Rowley	.61	[a]1.30
1913.				1917.			
Apr. 16	H. D. St. A. Smith	1.54	35.20	Apr. 12	do	.56	[e]1.56
25	do	1.03	4.20	13	do	1.81	[e]71.00
May 17	do	.83	3.19	21	do	2.42	[e]265.00
June 19	do	.70	2.75	27	do	1.45	88.00
July 15	do	.61	1.31	May 4	do	1.41	76.00
Aug. 11	do	.62	1.25	June 22	do	.50	1.28
Sept. 15	do	.63	.76	July 23	do	.42	[a].60
Oct. 8	do	.64	.68	Nov. 21	do	Dry.	0
31	do	.63	.78				

[a] Discharge determined by using weir.
[b] Discharge measured at miscellaneous section below gage.
[c] Made measurement at 10 a. m. Creek rose considerably shortly after.
[d] Discharge measured at miscellaneous section above gage.
[e] Gage moved 990 feet upstream on Apr. 21, 1917.

Daily discharge, in second-feet, of Oxarart Creek at Wylie's ranch, Sask., 1909–1917.

Day.	July.	Aug.	Sept.	Oct.	Nov.	Day.	July.	Aug.	Sept.	Oct.	Nov.
1909.						1910.					
1	.....	3.7	3	1.8	1.35	16	.....	3.7	1.8	2.3	1.15
2	.....	3.7	3	2.3	1.35	17	.....	3	1.8	2.3	.....
3	.....	3.7	3.7	2.3	1.35	18	.....	2.3	1.8	1.85	.....
4	.....	3.7	3.7	2.3	1.35	19	5.5	2.3	1.8	1.8	.....
5	.....	3.7	3	2.3	1.35	20	5.5	3	1.8	1.85	.....
6	.....	3.7	2.3	2.3	1.35	21	5.5	3	1.8	1.8	.....
7	.....	3.7	1.8	2.3	1.35	22	5.5	3.7	1.8	1.85	.....
8	.....	3.7	1.8	2.3	1.35	23	5.5	3.7	1.8	1.35	.....
9	.....	3.7	1.8	2.3	1.35	24	5.5	3.7	1.8	1.35	.....
10	.....	3.7	1.8	2.3	1.35	25	5.5	3.7	1.8	1.35	.....
11	.....	3.7	2.3	2.3	1.35	26	3.7	3.7	1.8	1.35	.....
12	.....	3.7	2.3	2.3	1.35	27	3.7	3.7	1.35	1.35	.....
13	.....	5.5	2.3	2.3	1.35	28	3.7	3	1.35	1.35	.....
14	.....	3.7	2.3	2.3	1.15	29	3.7	3	1.35	1.35	.....
15	.....	3.7	2.3	2.3	1.15	30	3.7	3	1.8	1.35	.....
						31	3.7	3	.....	1.35	.....

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1910.									
1	.....	12.0	2.8	1.5	1.50	0.65	0.72	0.65	.....
2	.....	12.0	2.8	1.5	1.50	.65	.72	.65	.....
3	.....	12.0	2.8	1.5	1.50	.65	.72	.65	.....
3	.....	12.0	2.8	1.5	1.50	.65	.72	.65	.....
5	.....	12.0	2.8	1.5	1.50	.79	.72	.65	.....
6	.....	9.3	2.8	1.5	1.50	.79	.72	.65	.....
7	.....	9.3	2.8	1.5	1.50	.79	.72	.65	.....
8	.....	9.3	2.8	1.5	.65	.72	.72	.65	.....
9	.....	9.3	2.8	1.5	.65	.65	.72	.65	.....
10	.....	6.8	2.8	1.5	.65	.65	.72	.65	.....
11	.....	4.6	2.8	1.5	.65	.65	.72	.65	.....
12	.....	4.6	2.8	1.5	.65	.72	.72	.65	.....
13	.....	2.8	2.8	1.5	.65	.72	.72	.65	.....
14	.....	2.8	2.8	1.5	.65	.72	.72	.65	.....
15	.....	2.8	2.8	1.5	.65	.72	.72	.65	.....
16	.....	2.8	2.8	1.5	.65	.72	.72	.65	.....
17	.....	2.8	2.8	1.5	.65	.72	.72	.65	.....
18	.....	2.8	2.8	1.5	.65	.72	.72	.65	.....
19	.....	2.8	2.8	1.5	.65	.72	.72	.65	.....
20	.....	2.8	2.8	1.5	.65	.72	.72	.65	.....
21	.....	2.8	2.8	1.5	.65	.72	.72	.65	.....
22	.....	2.8	2.8	1.5	.65	.72	.72	.65	.....
23	.....	2.8	2.8	1.5	.65	.72	.65	.65	.....
24	.....	2.8	2.8	1.5	.65	.72	.65	.65	.....
25	.....	2.8	1.5	1.5	.65	.72	.65	.65	.....
26	.....	2.8	1.5	1.5	.65	.72	.65	.65	.....
27	.....	2.8	1.5	1.5	.65	.72	.65	.65	.....
28	.....	2.8	1.5	1.5	.65	.72	.65	.65	.....
29	.....	2.8	1.5	1.5	.65	.72	.65	.65	.....
30	.....	2.8	1.5	1.5	.65	.72	.65	.65	.....
31	.....	.....	1.5	.....	.65	.72	.....	.65	.....

Daily discharge, in second-feet, of Oxarart Creek at Wylie's ranch, Sask., 1909–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1911.									
1		15.8	3.3	2.5	2.0	1.0	0.8	0.8	0.8
2		15.8	7.2	2.5	2.1	1.0	.8	.8	.8
3		15.8	18.0	2.5	2.1	1.0	.8	.8	.8
4		15.8	18.9	2.4	2.1	1.0	5.9	.8	.8
5		15.8	14.1	2.4	2.0	1.0	[a] 5.9	.8	.8
6		15.8	7.8	2.5	1.9	1.0	[a] 5.9	.8	.8
7		18.9	3.3	2.5	1.9	1.0	5.6	.8	.8
8		18.9	2.8	2.3	1.9	1.0	4.6	.8	.8
9		18.9	2.8	2.3	1.8	1.0	2.3	.8	.8
10		18.9	2.3	2.1	1.7	1.0	.8	.8	.8
11		15.8	2.1	2.1	1.7	1.0	.8	.8	.8
12		15.8	1.9	2.1	1.5	1.0	.8	.8	.8
13		18.9	1.9	2.1	1.5	.8	.8	.8	.8
14		18.9	1.9	2.1	1.5	.8	.8	.8	.8
15		18.9	1.9	2.1	1.5	.8	.8	.8	.8
16		15.8	1.9	2.1	1.4	.8	.8	.8	.....
17		17.0	1.9	2.1	1.4	.8	.8	.8	.....
18		8.2	2.3	2.1	1.4	.8	.8	.8	.....
19		12.7	2.3	2.1	1.4	.8	.8	.8	.....
20		14.4	1.9	2.1	1.4	.8	.8	.8	.....
21		13.0	2.3	2.2	1.3	.8	.8	.8	.....
22		12.0	2.5	2.2	1.3	.8	.8	.8	.....
23		3.4	2.5	2.2	1.2	.8	.8	.8	.....
24		3.1	2.3	2.3	1.2	.8	.8	.8	.....
25		2.8	2.3	2.1	1.1	.8	.8	.8	.....
26		2.5	2.4	2.1	1.1	.8	.8	.8	.....
27		2.1	2.4	2.1	1.1	.8	.8	.8	.....
28		1.9	2.4	2.1	1.0	.8	.8	.8	.....
29		1.7	2.3	2.1	1.0	.8	.8	.8	.....
30		1.5	2.3	2.0	1.0	.8	.8	.8	.....
31		.....	2.3	.....	1.0	.8	.....	.8	.....
1912.									
1		.....	14.2	6.2	2.5	1.00	1.12	.82	.47
2		.....	13.7	6.1	2.5	1.00	1.12	.80	.47
3		.....	7.4	6.0	2.5	1.00	1.15	.75	.47
4		.....	6.7	5.9	2.5	1.00	1.15	.70	.48
5		.....	6.7	5.8	2.3	1.50	1.15	.67	.48
6		.....	6.0	5.7	2.3	1.50	1.16	.65	.48
7		.....	9.3	5.6	2.3	1.50	1.17	.63	.48
8		537	11.3	5.5	2.3	1.50	1.17	.60	.48
9		370	11.5	5.3	2.3	1.00	1.18	.55	.48
10		333	8.2	5.1	2.3	1.00	1.19	.53	.48
11		210	6.7	5.0	2.3	1.00	1.20	.52	.48
12		111	6.7	5.0	2.3	1.00	1.20	.50	.48
13		55	6.0	7.0	2.2	1.16	1.20	.48	.48
14		48	5.7	6.8	2.2	1.16	1.21	.48	.48
15		35	5.7	6.7	2.2	1.10	1.22	.48	.48
16		34	6.0	6.5	2.2	1.10	1.25	.40	.....
17		28	6.0	6.0	2.2	1.10	1.20	.47	.....
18		27	6.0	6.0	2.2	1.16	1.15	.47	.....
19		24	6.0	4.5	2.2	1.16	1.10	.47	.....
20		21	6.0	4.0	2.2	1.12	1.05	.47	.....
21		19.4	6.0	3.0	1.10	1.12	1.02	.47	.....
22		17.9	6.0	3.0	1.10	1.13	1.00	.47	.....
23		17.9	6.0	2.8	1.10	1.13	1.07	.47	.....
24		17.6	6.0	2.7	1.10	1.14	1.05	.47	.....
25		17.6	6.0	2.0	1.10	1.14	1.03	.47	.....
26		14.2	6.3	2.0	1.10	1.16	.95	.47	.....
27		13.8	6.3	2.0	1.10	1.16	.92	.47	.....
28		13.7	14.2	2.5	1.10	1.16	.90	.47	.....
29		14.8	14.2	2.5	1.10	1.10	.88	.47	.....
30		15.2	14.2	2.5	1.10	1.10	.85	.47	.....
31		.....	6.3	.....	1.10	1.10	.....	.47	.....

[a] Estimated.

Daily discharge, in second-feet, of Oxarart Creek at Wylie's ranch, Sask., 1909–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1913.									
1	.....	a 50.0	5.4	4.1	4.30	1.42	0.83	0.65	.....
2	.....	a 50.0	5.6	4.2	4.00	1.42	.82	.74	.....
3	.....	a 45.0	4.6	4.2	3.70	1.41	.80	.73	.....
4	.....	44.0	7.2	4.3	3.70	1.41	.79	.72	.....
5	.....	a 44.0	7.5	4.4	3.80	1.40	.78	.72	.....
6	.....	a 40.0	7.4	4.5	3.50	1.40	.76	.71	.....
7	.....	a 40.0	5.4	4.6	2.60	1.39	.74	.71	.....
8	.....	a 40.0	5.2	4.6	2.60	1.39	.73	.70	.....
9	.....	a 35.0	5.4	4.7	2.20	1.38	.71	.69	.....
10	.....	a 35.0	4.5	4.7	1.80	1.37	.70	.69	.....
11	.....	32.0	4.8	4.8	1.80	1.15	.69	.70	.....
12	.....	a 30.0	4.0	4.9	1.60	1.14	.68	.70	.....
13	.....	a 30.0	4.1	4.9	1.60	1.12	.66	.71	.....
14	.....	a 35.0	3.9	5.0	1.50	1.11	.65	.72	.....
15	.....	a 35.0	3.6	5.0	1.50	1.08	.64	.73	.....
16	.....	34.0	3.1	5.1	1.50	1.07	.74	.75	.....
17	.....	31.0	3.5	5.2	1.50	1.06	.74	.76	.....
18	.....	28.0	3.6	5.3	1.49	1.04	.73	.76	.....
19	.....	24.0	3.7	5.4	1.49	1.02	.74	.77	.....
20	.....	24.0	3.8	3.2	1.49	1.01	.72	.78	.....
21	.....	16.6	3.9	4.4	1.48	1.00	.72	.79	.....
22	.....	14.5	3.9	4.4	1.48	.99	.71	.79	.....
23	.....	13.2	4.0	4.4	1.48	.98	.71	.80	.....
24	.....	11.5	4.0	4.4	1.47	.96	.70	.81	.....
25	.....	8.4	4.1	4.4	1.46	.94	.70	.82	.....
26	.....	8.6	4.1	4.4	1.46	.92	.69	.83	.....
27	.....	7.3	4.2	4.4	1.46	.90	.69	.84	.....
28	.....	6.5	4.2	4.4	1.44	.89	.69	.85	.....
29	.....	5.6	4.2	4.4	1.44	.83	.68	.86	.....
30	.....	5.3	4.2	4.4	1.44	.86	.68	.87	.....
31	.....	.....	4.1	.....	1.43	.85	.....	.87	.....
1914.									
1	.....	.50	3.40	2.60	2.00	0.33	.30	.42	.....
2	.....	.45	2.60	2.60	1.75	.33	.30	.43	.....
3	.....	.35	2.00	2.60	1.75	.52	.30	.45	.....
4	.....	7.25	2.00	2.60	1.30	.52	.31	.46	.....
5	.....	19.50	2.00	2.60	1.30	.41	.31	.48	.....
6	.....	14.25	2.00	2.60	1.30	.52	.31	.49	.....
7	.....	4.80	5.10	2.60	1.30	.74	.32	.50	.....
8	.....	4.50	7.60	2.60	1.30	.74	.32	2.10	.....
9	.....	4.50	7.60	2.60	1.30	.74	.33	3.40	.....
10	.....	2.20	3.00	2.60	1.00	.72	.33	2.30	.....
11	.....	3.40	3.00	2.60	1.00	.70	.33	3.30	.....
12	.....	3.40	2.80	2.60	1.00	.68	.34	3.50	.....
13	.....	15.60	2.80	2.60	.63	.66	.34	1.40	.....
14	.....	15.25	2.60	2.60	.52	.64	.35	1.10	.....
15	.....	15.80	2.60	2.00	.52	.62	.35	.76	.....
16	.....	14.60	2.60	2.00	.52	.60	.35	.45	.....
17	.....	12.40	2.60	2.00	.52	.58	.36	.40	.....
18	.....	10.40	2.60	2.00	.52	.56	.36	.40	.....
19	.....	10.80	2.60	2.00	.41	.54	.37	.40	.....
20	.....	9.60	2.60	2.00	.33	.52	.37	.39	.....
21	.....	9.60	2.60	2.00	.33	.50	.37	.38	.....
22	.....	8.10	2.60	2.00	.33	.48	.38	.37	.....
23	.....	8.40	2.60	2.00	.33	.46	.38	.36	.....
24	.....	7.60	2.60	2.00	.33	.44	.38	.35	.....
25	.....	5.80	2.60	2.00	.33	.42	.39	.34	.....
26	.....	4.40	2.60	2.00	.33	.40	.39	.32	.....
27	.....	3.60	2.60	2.00	.33	.38	.40	.33	.....
28	0.45	3.60	2.60	2.00	.33	.36	.40	.32	.....
29	.65	3.60	2.60	2.00	.25	.34	.41	.31	.....
30	.55	3.60	2.60	2.00	.25	.32	.41	.31	.....
31	.55	.....	2.60	.....	.25	.30	.....	.30	.....

a Estimated.

Daily discharge, in second-feet, of Oxarart Creek at Wylie's ranch, Sask., 1909–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1915.									
1	.....	58.00	1.10	2.00	2.00	1.28	1.15	0.82	.....
2	.....	207.00	1.10	3.10	2.00	1.28	1.15	.82	.....
3	.....	260.00	4.80	4.20	1.82	1.28	1.15	.82	.....
4	.....	91.00	9.70	7.70	1.82	1.28	1.15	.82	.....
5	.....	128.00	4.80	5.80	1.82	1.45	1.15	.82	.....
6	.....	62.00	2.00	3.70	1.82	1.45	1.15	1.01	.....
7	.....	58.00	2.00	3.10	1.82	1.45	1.15	1.01	.....
8	.....	26.00	2.00	2.00	5.80	1.45	1.15	1.15	.....
9	.....	17.00	2.00	2.00	6.80	1.45	1.15	1.15	.....
10	.....	17.00	1.82	2.00	4.80	1.45	1.15	1.30	.....
11	.....	26.00	2.00	2.00	2.00	1.45	1.15	1.30	.....
12	.....	17.00	2.60	2.00	1.82	1.45	1.15	1.30	.....
13	.....	21.00	9.70	2.00	2.00	1.45	1.15	1.30	.....
14	.....	4.80	10.20	1.82	2.00	1.45	1.01	1.15	.....
15	.....	9.70	17.00	2.00	2.00	1.45	1.01	1.15	.....
16	.....	2.00	9.70	2.00	2.00	1.45	1.01	1.01	.....
17	.....	1.10	8.90	2.00	2.00	1.45	1.01	.95	.....
18	.....	1.10	4.80	1.82	4.20	1.45	1.01	.95	.....
19	.....	[a] 1.10	3.70	1.82	4.20	1.53	1.01	.95	.....
20	.....	1.10	3.10	1.82	1.10	1.53	1.01	.82	.....
21	.....	1.10	2.00	2.00	1.28	1.53	1.01	.82	.....
22	.....	1.02	1.82	1.82	1.28	1.53	1.01	.76	.....
23	.....	1.10	1.82	1.82	1.28	1.53	1.01	.76	.....
24	.....	2.00	1.60	2.00	1.28	1.53	1.01	.76	.....
25	.....	2.00	1.50	2.00	1.28	1.53	1.01	.76	.....
26	.....	1.10	1.50	2.00	1.28	1.15	1.01	.76	.....
27	.....	1.02	1.82	2.00	1.28	1.15	1.01	.52	.....
28	.....	1.10	2.00	2.00	1.28	1.15	1.01	.52	.....
29	14	1.10	2.00	2.00	1.28	1.15	1.01	.52	.....
30	58	1.28	2.00	2.00	1.10	1.15	1.01	.52	.....
31	102	.....	2.00	.....	1.28	1.15	.....	.52	.....
1916.									
1	.....	[b] 2.5	4.0	20.0	10.3	3.50	1.90	1.42	1.30
2	.....	[b] 2.5	4.0	18.3	9.8	2.70	1.90	1.54	1.30
3	.....	29.0	4.0	15.7	9.8	2.70	1.78	1.66	1.30
4	.....	28.0	4.0	12.7	10.8	2.70	1.90	1.66	1.30
5	8.3	8.0	4.0	15.2	9.8	2.70	1.90	1.54	1.22
6	8.3	7.0	4.0	30.0	8.0	2.70	1.90	1.66	1.22
7	8.3	9.2	4.0	18.8	6.2	2.70	1.90	1.90	1.22
8	33.0	8.3	4.0	14.2	5.8	2.70	1.90	1.90	1.22
9	75.0	7.0	4.0	10.8	5.8	3.00	1.90	1.78	1.22
10	71.0	7.8	4.0	13.7	5.8	3.00	1.90	1.66	1.22
11	134.0	9.7	4.0	20.0	5.4	2.70	1.78	1.54	1.22
12	47.0	11.3	3.5	28.0	4.7	2.70	1.78	1.42	.....
13	82.0	16.4	3.5	32.0	4.7	2.70	1.78	1.42	.....
14	54.0	21.0	3.0	22.0	4.7	2.70	1.78	1.42	.....
15	26.0	16.4	2.7	16.8	4.4	2.70	1.78	1.42	.....
16	17.9	12.0	2.7	13.7	3.5	2.70	1.78	1.30	.....
17	36.0	8.8	2.7	12.2	3.5	2.50	1.78	1.30	.....
18	7.0	15.5	2.7	10.8	3.5	2.40	1.90	1.30	.....
19	6.3	9.7	2.7	8.9	4.0	2.40	2.40	1.30	.....
20	12.0	5.8	2.7	8.0	4.0	2.40	3.20	1.30	.....
21	47.0	6.8	2.7	8.0	4.0	2.40	3.20	1.42	.....
22	51.0	6.1	2.7	9.8	4.0	2.40	3.20	1.42	.....
23	50.0	5.6	2.5	12.7	4.0	2.40	3.00	1.42	.....
24	24.0	6.8	2.5	12.2	4.0	2.40	3.00	1.42	.....
25	23.0	5.6	2.7	9.8	8.0	2.40	3.00	1.42	.....
26	19.7	3.5	10.3	7.1	12.7	2.40	3.20	1.42	.....
27	27.0	2.6	20.0	7.1	23.0	[b] 2.30	1.42	1.42	.....
28	29.0	4.0	15.2	6.7	12.7	[b] 2.20	1.42	1.30	.....
29	28.0	4.0	16.2	7.1	8.0	[b] 2.10	1.42	1.30	.....
30	14.5	4.0	18.8	9.8	4.7	[b] 2.00	1.42	1.30	.....
31	5.3	.....	20.0	.....	4.0	1.90	.....	1.30	.....

[a] Interpolated.

[b] Estimated.

Daily discharge, in second-feet, of Oxarart Creek at Wylie's ranch, Sask., 1909–1917—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1917.							1917.						
1	.....	70.00	0.09	1.28	0.52	0.04	16	266	60.00	.....	0.86	0.26	.....
2	.....	70.00	.68	2.50	.43	.....	17	169	39.00	.....	.86	.22	.....
3	.....	71.00	.94	3.80	.39	.....	18	137	32.00	.....	.77	.22	.....
4	.....	79.00	.77	4.40	.39	.....	19	164	24.00	.....	.77	.17	.....
5	.....	86.00	.13	1.02	.39	.....	20	218	18.20	.....	.68	.17	.....
6	.....	91.00	.....	1.11	.39	.....	21	266	16.10	*a* .50	.68	.17	.....
7	.....	99.00	.....	1.28	.30	.....	22	233	11.40	1.28	.68	.17	.....
8	.....	96.00	.....	1.28	.30	.....	23	165	8.20	1.28	.60	.17	.....
9	.....	86.00	.....	1.02	.30	.....	24	88	5.00	1.28	.77	.17	.....
10	.....	81.00	.....	1.11	.26	.....	25	83	*a* 3.00	1.28	.68	.13	.....
11	.....	81.00	.....	1.20	.26	.....	26	86	1.02	1.28	.68	.13	.....
12	72	79.00	.....	1.11	.26	.....	27	84	.94	1.20	.68	.09	.....
13	137	76.00	.....	.94	.26	.....	28	88	.52	1.11	.68	.04	.....
14	180	69.00	.....	.94	.30	.....	29	76	.30	1.11	.60	.04	.....
15	332	63.00	.....	.86	.30	.....	30	66	.22	1.28	.60	.04	.....
							31	.....	.17	.....	.52	.04	.....

a Interpolated.

NOTE.—1911: Discharge during October and November from springs just above station.
1914: Shifting control Mar. 28 to Apr. 9 and Aug. 6 to Oct. 31.
1915: 36-inch weir used as control Aug. 5 to Oct. 31.
1916: Shifting control Mar. 26 to Apr. 7. Apr. 28, new station established 500 feet downstream.
1917: Apr. 21, gage moved 900 feet upstream. Water standing in pools June 6–20 and Sept. 2 to Oct. 31.

Monthly discharge of Oxarart Creek at Wylie's ranch, Sask., 1909–1917.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1909.						
July 19–31	5.5	3.7	4.67	0.064	0.031	120
August	5.5	2.3	3.51	.048	.055	216
September	3.7	1.35	2.11	.029	.032	126
October	2.3	1.35	1.93	.026	.030	119
November 1–16	1.35	1.15	1.31	.018	.011	42
The period	.....	.....	.....	.....	.....	623
1910.						
April	12.00	2.80	5.450	.074	.083	324
May	2.80	1.50	2.510	.034	.039	154
June	1.50	1.50	1.500	.021	.023	89
July	1.50	.65	.841	.012	.014	52
August	.79	.65	.710	.010	.012	44
September	.72	.65	.700	.010	.011	42
October	.65	.65	.680	.009	.010	40
The period	.....	.....	.....	.....	.....	745
1911.						
April	18.9	1.5	12.4	.170	.190	738
May	18.9	1.9	4.1	.056	.065	252
June	2.5	2.0	2.2	.030	.034	131
July	2.1	1.0	1.5	.021	.024	92
August	1.0	.8	.9	.013	.015	55
September	5.9	.8	1.6	.022	.024	95
October	.8	.8	.8	.011	.013	49
November 1–15	.8	.8	.8	.011	.006	24
The period	.....	.....	.....	.....	.371	1,436
1912.						
April 8–30	537	13.7	86.7	1.18	1.01	3,955
May	14.2	5.7	7.97	.109	.13	490
June	7.0	2.0	4.65	.064	.07	277
July	2.5	1.10	1.88	.026	.03	116
August	1.50	1.00	1.14	.016	.02	70
September	1.25	.85	1.10	.015	.02	66
October	.82	.40	.536	.007	.01	33
November 1–15	.48	.47	.411	.006	.003	12
The period	.....	.....	.....	.....	1.29	5,019

Monthly discharge of Oxarart Creek at Wylie's ranch, Sask., 1909–1917—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1913.						
April	50.00	5.30	27.480	0.376	0.42	1,636
May	7.50	3.10	4.550	.062	.07	280
June	5.40	3.20	4.570	.063	.07	272
July	4.30	1.43	2.060	.028	.03	127
August	1.42	.85	1.130	.015	.02	69
September	.83	.68	.721	.010	.01	43
October	.87	.65	.760	.010	.01	47
The period					.63	2,474
1914.						
March 28–31	.65	.45	.55	.0071	.001	4
April	19.50	.35	7.60	.0987	.110	452
May	7.60	2.00	3.00	.0390	.045	184
June	2.60	2.00	2.30	.0290	.033	135
July	2.00	.25	.76	.0100	.010	47
August	.74	.30	.52	.0070	.008	32
September	.41	.30	.35	.0046	.005	21
October	3.50	.30	.86	.0110	.013	53
The period					.225	928
1915.						
March 29–31	102.00	14.00	58.00	.7530	.08	345
April	260.00	1.20	34.00	.4420	.49	2,023
May	17.00	1.10	4.00	.0500	.06	246
June	7.70	1.82	2.50	.0325	.04	149
July	6.80	1.10	2.20	.0286	.03	135
August	1.53	1.15	1.39	.0180	.02	85
September	1.15	1.01	1.07	.0140	.02	64
October	1.30	.52	.90	.0117	.01	55
The period					.75	3,102
1916.						
March 5–31	134.00	5.30	35.00	.450	.46	1,873
April	29.00	2.50	9.50	.123	.14	565
May	20.00	2.50	5.90	.077	.09	363
June	32.00	6.70	14.40	.187	.21	857
July	23.00	3.50	6.90	.090	.10	424
August	3.50	1.90	2.60	.034	.04	160
September	3.20	1.42	2.10	.027	.03	125
October	1.90	1.30	1.47	.019	.02	90
November 1–11	1.30	1.22	1.25	.016	.01	27
The period					1.10	4,484
1917.						
April 12–30	332.00	66.00	153.00	1.990	1.410	5,765
May	99.00	.17	46.00	.597	.690	2,828
June	1.28	Nil.	.47	.006	.007	28
July	4.40	.52	1.13	.015	.017	69
August	.52	.04	.23	.003	.004	14
September	.04	.00	.00	.00	.00	00
The period					2.128	8.704

NOTE.—Area used in computing these tables is the same as published in the Canadian hydrometric reports which was changed from time to time as more definite information of the drainage basin was obtained.

Mean monthly discharge, in second-feet, of Oxarart Creek at Wylie's ranch, Sask., 1909–1917.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total in acre-feet.
1909	.....	.....	.....	.....	[a] 4.7	3.50	2.10	1.93	[a] 1.31	623
1910	.....	5.4	2.5	1.50	.84	.71	.70	.68	.....	745
1911	.....	12.4	4.1	2.20	1.50	.90	1.60	.80	[a] .80	1,436
1912	.....	[a] 87.0	8.0	4.60	1.88	1.14	1.10	.54	[a] .41	5,019
1913	.....	27.0	4.6	4.60	2.10	1.13	.72	.76	.....	2,474
1914	[a] 0.55	7.6	3.0	2.30	.76	.52	.35	.86	.....	928
1915	[a] 58.00	34.0	4.0	2.50	2.20	1.39	1.07	.90	.....	3,102
1916	[a] 30.00	9.5	5.9	14.40	6.90	2.60	2.10	1.47	[a] 1.25	4,484
1917	.....	[a] 153.0	46.0	.47	1.13	.23	0	0	.....	8,704
Average	[b] 8	[b] 37.0	9.8	4.1	2.2	1.35	1.08	.88	.....	3,064
Average run-off, acre-feet	492	2,201	603	244	135	83	64	54	.....	3,876
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	50

[a] Incomplete record not included in average. [b] Estimated.

SUCKER CREEK AT GILCHRIST'S RANCH, SASK.

LOCATION.—In NW. ¼ sec. 24, T. 6, R. 26 W. third meridian, about 5 miles south of Belanger post office and about 32 miles south of Maple Creek.

DRAINAGE AREA.—30 square miles.

RECORDS AVAILABLE.—May 25, 1909, to October 31, 1917.

GAGE.—Vertical staff; read by J. D. Gilchrist. A Stevens continuous water-stage recorder was installed at this station November 13, 1917, to obtain more accurate flood data.

DISCHARGE MEASUREMENTS.—Made from footbridge at high stages, by wading at ordinary stages, and with weir at low stages. A cable was installed at this station November 13, 1917, so that measurements can be made during flood stages.

CHANNEL AND CONTROL.—Bed of stream, sand and coarse gravel. Right bank high; sand and coarse gravel; not subject to overflow; left bank made up of sand and gravel and subject to overflow in flood stages. One channel at all stages; control likely to shift.

EXTREMES OF DISCHARGE.—1909–1917: Maximum stage recorded, 4.46 feet, April 5, 1912 (discharge, 615 second-feet); no flow March 22 to 29, 1914.

ICE.—Station not maintained during winter.

ACCURACY.—Stage-discharge relation not constant. Gage read to hundredths twice daily during high water and once daily during remainder of season. Daily discharge obtained by applying mean daily gage heights to rating table. Records fair.

Discharge measurements of Sucker Creek at Gilchrist's ranch, Sask., 1909–1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1909.		*Feet.*	*Sec.-ft.*	1913.		*Feet.*	*Sec.-ft.*
May 26	H. R. Carscallen	0.94	9.66	July 26	E. W. W. Hughes	0.65	1.22
June 11	do	.66	3.33	Sept. 2	do	.76	1.70
29	do	1.455	27.9	29	do	.81	2.50
Aug. 5	do	.54	1.17	Oct. 20	do	.83	1.98
26	do	.47	.67	Nov. 13	do	.82	2.20
Sept. 27	do	.57	1.94	1914			
1910.				Mar. 15	M. H. French	2.17	45.00
Apr. 20	do	.72	4.19	21	do	1.18	3.00
May 13	do	.64	3.04	May 9	F. R. Steinberger	1.21	20.00
June 2	do	.59	2.35	27	do	.80	2.30
20	R. G. Swan	.51	1.17	June 29	do	.75	1.42
July 18	do	.36	.23	July 22	do	.43	*b* .16
Aug. 8	do	.55	1.68	Aug. 12	do	.46	*b* .18
29	do	.54	1.76	31	E. W. W. Hughes	.64	1.16
Sept. 20	do	.57	1.72	Sept. 21	do	.73	1.62
Oct. 17	do	.60	2.19	Oct. 18	do	.79	2.10
1911.				1915.			
Apr. 20	G. H. Whyte	1.42	27.99	Mar. 30	M. H. French	.84	6.04
May 18	do	.81	5.33	Apr. 12	do	1.26	11.00
June 14	do	.60	2.02	May 16	J. E. Caughey	1.41	14.00
July 13	do	.58	1.78	June 17	do	1.01	3.60
Aug. 16	do	.56	1.45	July 16	do	1.02	3.30
Sept. 20	do	.655	2.69	Aug. 6	do	.95	2.94
1912.				27	do	.94	1.10
Apr. 2	M. H. French	1.10	*a* 2.15	Sept. 28	do	1.00	3.50
6	do	3.20	99.02	Oct. 18	do	.98	2.50
6	do	3.70	218.08	29	do	.98	2.20
8	do	4.20	448.81	1916.			
23	do	2.00	18.13	Apr. 6	M. H. French	1.12	8.8
May 22	J. S. Wright	1.70	3.53	May 11	J. E. Caughey	1.01	3.6
June 13	do	1.58	2.62	June 10	do	1.20	14.1
July 12	do	1.65	2.23	July 12	do	.99	3.6
Aug. 9	do	1.57	.95	Oct. 24	L. P. B. Miles	1.09	5.7
Sept. 10	do	1.64	2.23	1917.			
Oct. 15	do	1.68	3.00	Apr. 14	H. W. Rowley	2.94	*c* 213.00
Nov. 13	do	1.69	2.88	19	do	2.40	157.00
1913.				May 1	do	1.76	52.00
Apr. 16	do	1.55	39.00	3	do	2.02	80.00
May 20	E. W. W. Hughes	1.01	6.50	25	do	1.55	14.80
June 23	do	.78	2.80	July 7	do	1.25	2.30
26	do	.84	3.70	24	do	1.15	*b* .81

a Ice conditions. *b* Discharge determined by using a 24-inch weir. *c* Ice going out.

Daily discharge, in second-feet, of Sucker Creek at Gilchrist's ranch, Sask., 1909–1917.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1909.							1909.						
1	.....	4	14.4	3.1	1	2	16	.....	3.1	6.1	0.55	1.6	2.6
2	.....	4	11.35	3.1	1	2	17	.....	14.4	6.1	.5	1.6	2.6
3	.....	2.3	8.6	2.6	2.3	2.3	18	.....	7.3	5	.45	4	2.6
4	.....	2.3	8.6	2	1.6	2.45	19	.....	14.4	4	.45	3.1	2.6
5	.....	2.3	a80.9	1.0	1.6	2.45	20	.....	a255	3.1	.45	3.1	2.6
6	.....	2.3	a39.6	1	1	2.45	21	.....	a220	3.1	.5	3.1	2.6
7	.....	4	21.4	1	1	2.45	22	.....	a45.1	3.1	.55	4	2.6
8	.....	5	14.4	2.3	1	2.45	23	.....	a34.5	3.1	.55	4	2.6
9	.....	6.1	14.4	1.6	1	2.45	24	.....	25.4	3.1	.8	3.1	2.6
10	.....	3.1	11.35	1	.75	2.6	25	11.35	29.8	3.1	1	2.3	2.6
11	.....	4	11.35	1	1.25	2.6	26	8.6	16.1	6.1	1	2.3	2.6
12	.....	5	14.4	1	1.6	2.6	27	6.1	12.8	4	2.3	1.6	2.6
13	.....	3.1	12.9	1.6	2.45	2.6	28	6.1	a90.4	8.6	1.6	1.6	2.6
14	.....	2.95	11.35	1	2.45	2.6	29	4	29.8	6.1	1.6	1.6	2.6
15	.....	2.8	8.6	1	2.3	2.6	30	4	21.5	4	1.25	1.6	2.6
							31	4	.....	3.1	1	.....	2.6

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1910.									
1	.....	7.25	3.00	2.06	1.26	0.40	2.18	1.94	.....
2	.....	7.25	3.00	2.30	1.15	.40	1.82	1.94	.....
3	.....	6.35	3.00	2.58	.97	.40	1.70	1.94	.....
4	.....	6.35	2.86	2.44	1.70	.40	2.30	2.18	.....
5	.....	5.45	2.72	2.30	1.15	5.45	2.58	2.30	.....
6	.....	7.25	2.58	2.06	.70	2.30	2.30	2.30	.....
7	.....	6.35	2.44	2.06	.97	1.70	2.72	2.30	.....
8	.....	6.35	2.30	1.94	.88	1.48	2.58	2.30	.....
9	.....	7.25	2.30	1.94	1.15	1.26	2.30	2.30	.....
10	.....	7.25	2.30	1.70	1.15	1.15	2.30	2.90	.....
11	.....	6.71	2.30	1.48	1.15	1.06	2.06	2.30	.....
12	.....	6.35	3.00	1.37	.70	1.06	1.82	2.30	.....
13	.....	7.25	2.86	1.37	.58	3.00	1.82	2.30	.....
14	.....	6.35	2.58	1.26	.40	2.30	1.70	2.30	.....
15	.....	5.99	3.80	1.26	.20	2.18	1.70	2.30	.....
16	.....	5.45	3.00	1.15	.20	1.94	1.70	2.30	.....
17	.....	4.60	2.58	1.70	.20	1.70	1.70	2.18	.....
18	.....	4.44	2.58	1.15	.10	1.48	1.70	2.18	.....
19	.....	4.28	2.44	1.15	.10	1.37	1.70	2.18	.....
20	.....	4.12	2.44	.70	.10	1.26	1.70	2.30	.....
21	.....	3.80	2.44	.97	.20	1.26	1.70	2.44	.....
22	.....	3.80	2.30	1.15	.70	1.37	2.30	2.44	.....
23	.....	3.64	2.30	1.37	1.70	1.70	2.30	2.30	.....
24	.....	3.32	2.30	1.15	1.15	1.94	2.30	2.30	.....
25	.....	3.00	2.30	.70	.70	1.70	2.30	2.30	.....
26	.....	3.00	2.18	.52	.70	1.37	2.30	2.30	.....
27	.....	3.00	2.18	.46	.70	1.37	2.30	2.30	.....
28	.....	3.00	2.18	.40	.58	1.37	2.30	2.30	.....
29	.....	3.00	2.18	.40	.58	1.59	2.18	2.30	.....
30	.....	3.00	2.06	1.70	.40	1.48	2.06	2.30	.....
31	.....	.....	2.06	.....	.40	1.48	.....	2.30	.....

a Estimated.

Daily discharge, in second-feet, of Sucker Creek at Gilchrist's ranch, Sask., 1909–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1911.									
1	.....	17.6	7.4	2.1	5.5	1.0	0.9	3.0	3.0
2	.....	7.4	10.1	2.0	10.1	1.2	.9	3.5	.....
3	.....	3.3	13.5	2.0	4.2	1.3	.9	3.3	.....
4	.....	3.3	16.7	2.0	3.3	1.4	3.3	3.2	.....
5	.....	3.3	15.5	2.6	2.6	1.4	8.7	3.2	.....
6	.....	4.2	11.7	2.4	1.4	3.3	10.1	3.0	.....
7	.....	4.9	5.8	3.3	1.3	3.3	15.5	3.0	.....
8	.....	5.5	4.2	3.1	2.0	2.0	9.5	2.9	.....
9	.....	87.0	4.9	2.6	2.0	1.8	5.1	2.9	.....
10	.....	113.0	4.6	2.4	2.0	1.6	3.3	2.9	.....
11	.....	97.0	4.2	2.0	1.4	1.5	2.7	2.9	.....
12	.....	32.0	3.7	1.5	1.4	1.5	2.4	2.9	.....
13	.....	22.2	3.5	1.8	1.4	1.4	3.5	2.7	.....
14	.....	17.6	3.3	1.4	.9	1.1	3.2	2.7	.....
15	.....	14.7	3.5	1.2	1.2	1.4	2.5	2.7	.....
16	.....	13.5	7.4	.6	.9	1.2	2.1	2.7	.....
17	.....	58.0	8.7	.3	.9	1.0	2.6	2.7	.....
18	.....	72.0	4.4	.9	1.2	.9	2.9	3.0	.....
19	.....	44.5	4.2	.9	1.2	.9	2.6	3.0	.....
20	.....	29.5	3.5	1.2	1.0	.9	2.2	3.0	.....
21	.....	34.5	3.3	2.6	.9	.9	2.2	3.0	.....
22	.....	28.5	3.5	2.4	.9	.9	2.6	3.0	.....
23	.....	21.3	3.7	1.8	.9	.9	3.3	3.0	.....
24	.....	10.7	3.5	1.5	.9	.9	4.2	3.3	.....
25	.....	10.1	4.2	3.3	.6	1.4	3.7	3.5	.....
26	.....	8.7	3.8	41.0	.6	2.0	3.3	3.5	.....
27	.....	6.2	3.7	10.1	.6	1.5	3.3	3.3	.....
28	.....	7.4	3.3	5.1	.6	1.0	3.3	3.0	.....
29	13.5	6.2	3.1	3.3	.6	.9	3.3	3.0	.....
30	22.2	6.7	2.9	3.7	.9	.9	3.3	3.0	.....
31	13.5	.....	2.6	.....	.9	.9	.....	3.0	.....
1912.									
1	.....	2.00	18.0	8.0	1.50	.80	2.60	3.35	3.35
2	.....	2.15	15.5	3.5	1.50	1.70	3.05	3.20	3.35
3	.....	2.00	15.5	3.0	1.60	2.00	3.35	3.05	3.35
4	.....	2.00	15.5	2.9	1.80	2.75	3.95	3.20	3.35
5	.....	600.00	15.5	2.8	2.2	3.05	3.95	3.20	3.50
6	.....	400.00	13.0	2.5	2.8	2.75	3.20	3.20	3.50
7	.....	220.00	20.0	2.3	2.9	2.40	3.20	3.20	3.50
8	.....	450.00	28.0	2.3	3.0	1.90	2.75	3.20	3.35
9	.....	615.00	22.0	2.2	3.0	1.70	2.75	3.95	3.35
10	.....	278.00	18.0	2.0	2.9	1.50	2.60	3.95	3.35
11	.....	175.00	17.0	1.90	2.8	1.40	2.60	3.35	3.35
12	.....	69.00	13.0	1.80	2.8	1.60	2.60	3.35	3.35
13	.....	35.00	8.5	1.80	3.0	1.70	2.90	3.35	3.35
14	.....	30.00	8.0	2.8	2.8	1.70	2.90	3.20	3.35
15	.....	28.00	8.0	6.2	2.4	1.70	3.35	3.20	3.35
16	.....	30.00	7.6	15.0	2.8	3.35	3.20	3.20	.....
17	.....	28.00	3.5	8.5	2.6	3.50	3.05	3.20	.....
18	.....	27.00	3.5	5.3	2.4	3.95	3.05	3.95	.....
19	.....	24.00	3.5	3.2	2.3	3.50	3.35	3.95	.....
20	.....	24.00	3.5	2.8	2.2	3.05	3.35	4.40	.....
21	.....	22.00	3.5	2.6	2.3	2.60	3.35	4.40	.....
22	.....	20.00	4.0	2.0	1.90	2.45	3.95	3.50	.....
23	.....	18.00	3.5	1.80	1.90	2.30	4.40	3.50	.....
24	.....	18.00	3.5	1.60	1.70	2.15	3.50	3.50	.....
25	.....	18.00	3.5	1.50	1.40	2.60	3.50	3.50	.....
26	.....	13.00	3.5	1.00	1.40	2.45	3.35	3.50	.....
27	.....	14.00	4.4	.90	1.40	3.20	3.35	3.50	.....
28	.....	13.00	30.0	.80	1.30	3.35	3.50	3.50	.....
29	.....	13.00	24.0	1.00	1.30	3.50	3.35	3.50	.....
30	.....	18.00	12.5	1.30	1.10	3.35	3.35	3.50	.....
31	.....	.....	9.0	.....	.80	3.05	.....	3.50	.....

Daily discharge, in second-feet, of Sucker Creek at Gilchrist's ranch, Sask., 1909–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1913.									
1	.....	92.0	7.60	2.80	2.20	1.00	1.60	2.20	.....
2	.....	68.0	10.00	2.40	2.40	.55	1.70	2.20	.....
3	.....	44.0	10.00	2.40	2.40	.52	1.29	2.20	.....
4	.....	64.0	9.00	2.40	5.40	.50	.64	2.10	.....
5	.....	113.0	6.30	2.40	3.10	1.02	.25	2.20	.....
6	.....	166.0	7.60	2.20	2.40	1.00	.38	2.80	.....
7	.....	154.0	7.10	1.92	1.80	1.20	.51	2.40	.....
8	.....	117.0	7.60	1.80	1.56	1.52	.51	2.40	.....
9	.....	92.0	7.60	1.80	1.21	2.10	.64	2.40	.....
10	.....	65.0	8.20	1.80	1.56	2.10	.90	2.30	.....
11	.....	53.0	7.60	1.80	2.40	2.00	1.03	2.10	.....
12	.....	92.0	7.10	1.92	2.40	1.42	1.03	2.10	.....
13	.....	98.0	7.10	3.20	3.80	1.43	1.03	2.10	.....
14	.....	101.0	14.80	3.40	2.40	2.60	1.16	2.00	.....
15	.....	70.0	12.50	1.68	1.80	1.98	1.42	2.30	.....
16	.....	35.0	11.40	1.68	1.80	2.00	1.56	2.30	.....
17	.....	22.0	10.60	2.00	1.56	2.00	1.56	2.20	.....
18	.....	16.4	9.30	2.40	1.21	2.60	1.56	2.20	.....
19	.....	16.4	8.20	2.60	1.21	2.20	1.70	2.10	.....
20	.....	13.0	6.30	7.60	1.21	1.90	1.85	2.10	.....
21	.....	12.1	5.90	3.80	.66	1.20	2.00	2.10	.....
22	.....	10.3	5.90	4.30	2.40	1.22	2.80	2.00	.....
23	.....	9.0	5.90	2.40	1.80	1.12	3.10	2.00	.....
24	.....	7.6	5.60	3.80	1.21	.50	2.00	2.10	.....
25	.....	7.1	5.20	4.10	1.21	.48	2.80	2.10	.....
26	.....	7.1	4.90	4.10	1.21	.70	2.30	2.20	.....
27	.....	7.1	4.60	3.40	1.23	.65	2.30	2.20	.....
28	.....	7.3	4.60	2.60	1.58	.50	2.30	2.10	.....
29	.....	7.6	4.60	2.40	1.17	.58	2.20	2.20	.....
30	.....	7.6	3.10	1.80	1.25	1.98	2.10	2.30	.....
31	.....	.....	3.20	.....	1.09	1.75	.....	2.40	.....
1914.									
1	.....	1.7	4.8	1.92	1.44	.13	.50	1.36	.....
2	.....	7.7	4.8	2.10	1.12	.13	.50	1.76	.....
3	.....	11.4	4.2	1.60	.96	.13	.50	2.20	.....
4	.....	16.2	4.2	1.60	.80	.13	.50	7.50	.....
5	.....	28.0	4.5	2.40	.74	.13	.47	7.20	.....
6	.....	32.0	4.5	4.50	.74	.14	.44	3.20	.....
7	.....	42.0	4.8	3.40	.32	.15	.50	4.00	.....
8	.....	50.0	4.5	2.40	.17	.15	.56	7.50	.....
9	.....	47.0	24.0	2.10	.17	.16	.50	4.80	.....
10	.....	37.0	15.6	2.10	.16	.16	.47	4.20	.....
11	.....	31.0	10.1	2.10	.16	.16	.50	3.70	.....
12	.....	92.0	8.8	2.10	.38	.16	1.12	2.40	.....
13	.....	85.0	7.5	3.40	.19	.16	7.50	2.40	.....
14	.....	53.0	6.4	3.40	.17	.16	2.20	2.40	.....
15	54.00	32.0	4.8	2.40	.38	.16	.96	2.40	.....
16	45.00	11.6	4.0	2.20	.16	.16	.80	3.70	.....
17	43.00	31.0	4.0	2.10	.41	.18	.80	2.40	.....
18	43.00	11.6	3.7	1.76	.18	.20	.88	2.40	.....
19	43.00	10.6	3.7	1.52	.19	.38	1.28	2.10	.....
20	3.10	10.6	3.4	3.40	.17	.32	1.28	1.92	.....
21	3.10	10.1	3.2	3.40	.13	.32	1.28	2.10	.....
22	.....	11.2	2.6	2.10	.13	.32	1.20	1.92	.....
23	.....	[a] 9.7	2.2	1.76	.12	.41	1.28	1.92	.....
24	.....	[a] 8.3	3.2	1.60	.12	1.04	1.28	1.92	.....
25	.....	7.2	2.4	3.40	.13	1.04	1.28	1.92	.....
26	.....	6.4	2.1	2.40	.13	.96	1.28	1.92	.....
27	.....	5.4	2.4	2.10	.14	.96	1.28	1.92	.....
28	.....	5.1	2.4	1.60	.12	.74	1.28	2.20	.....
29	.....	4.8	2.2	1.60	.13	.56	1.28	2.80	.....
30	.05	4.8	2.2	1.52	.12	.56	1.28	2.80	.....
31	.10	.....	2.1	.....	.12	.50	.....	2.80	.....

[a] Estimated.

Daily discharge, in second-feet, of Sucker Creek at Gilchrist's ranch, Sask., 1909–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1915.									
1	.....	6.6	8.3	10.5	3.0	3.2	3.0	2.0	.....
2	.....	22.0	8.3	10.5	3.0	3.0	17.2	2 3	.....
3	.....	102.0	8.4	10.5	3.0	3.0	3.0	3.0	.....
4	.....	62.0	8.5	10.5	2.3	3.0	16.5	3.0	.....
5	.....	38.0	8.6	10.5	1.6	2.7	14.2	2.6	.....
6	.....	18.9	8.7	9.8	1.6	2.4	3.0	2.7	.....
7	.....	16.0	8.7	9.0	1.6	2.4	6.7	3.0	.....
8	.....	12.5	8.8	8.2	3.8	2.4	4.5	17.2	.....
9	.....	12.5	8.8	3.8	5.7	2.3	7.1	16.0	.....
10	.....	12.1	8.9	3.8	5.4	2.3	3.0	15.0	.....
11	.....	10.8	8.9	3.8	3.0	2.0	4.5	3.0	.....
12	.....	11.0	9.0	3.8	2.3	2.0	4.5	3.0	.....
13	.....	11.9	9.1	3.6	2.3	2.0	5.2	3.0	.....
14	.....	11.8	9.2	3.0	3.8	2.0	3.0	3.0	.....
15	.....	11.8	9.2	3.0	3.8	2.0	3.0	3.8	.....
16	.....	11.8	9.2	3.8	3.3	3.0	2.3	3.0	.....
17	.....	11.8	a6.0	3.2	3.6	2.7	2.3	4.0	.....
18	.....	11.7	3.4	1.6	7.5	2.7	2.2	2.7	.....
19	.....	9.7	3.8	3.0	7.5	4.5	2.6	2.9	.....
20	.....	9.3	3.6	4.6	7.5	4.2	2.3	2.6	.....
21	.....	a9.2	3.6	3.6	4.8	4.2	2.2	2.6	.....
22	.....	9.1	3.4	3.2	3.6	3.0	1.6	2.3	.....
23	6.6	8.5	3.4	3.0	3.0	3.8	1.6	2.4	.....
24	5.1	8.5	3.4	1.6	4.2	2.7	.4	3.0	.....
25	6.1	8.3	2.9	5.2	3.8	2.7	.4	3.8	.....
26	6.6	8.3	3.0	4.5	3.6	2.2	.8	4.0	.....
27	5.4	8.3	3.0	3.8	3.6	2.2	.8	3.4	.....
28	6.4	a8.3	1.9	3.0	3.8	2.2	3.0	3.3	.....
29	6.5	a8.3	1.9	3.0	3.9	3.0	1.6	3.6	.....
30	5.1	a8.3	3.0	3.0	3.4	3.0	1.7	3.0	.....
31	5.7	.....	3.0	.....	3.3	3.0	.....	3.6	.....
1916.									
1	.....	21.0	12.0	22.00	3.6	3.60	1.17	22.0	2.1
2	.....	14.1	5.8	14.10	14.1	2.50	1.30	30.0	2.1
3	.....	14.1	12.0	3.60	14.1	2.50	1.30	46.0	2.3
4	.....	12.7	19.6	22.00	3.6	2.10	.90	5.8	2.3
5	.....	10.6	12.0	78.00	3.6	2.10	1.14	6.3	2.3
6	.....	10.0	6.3	46.00	3.6	2.50	1.17	7.2	2.1
7	.....	10.0	6.3	22.00	62.0	1.88	1.17	6.7	2.1
8	.....	10.0	5.4	3.60	14.1	.90	1.17	6.7	2.1
9	.....	10.6	5.8	3.10	7.6	.77	.77	6.3	2.3
10	.....	22.0	5.8	30.00	3.6	1.17	2.50	4.7	.....
11	.....	26.0	30.0	22.00	3.6	1.17	2.50	7.6	.....
12	.....	28.0	14.1	3.60	3.1	1.17	2.80	11.3	.....
13	.....	17.2	7.6	3.30	3.1	.9	2.50	8.8	.....
14	.....	22.0	3.6	30.00	2.5	1.17	2.80	8.8	.....
15	.....	20.0	7.6	14.10	2.8	1.30	2.80	8.8	.....
16	.....	20.0	7.6	7.60	2.8	1.30	2.80	8.2	.....
17	.....	10.6	22.0	30.00	14.1	1.17	2.80	7.2	.....
18	.....	21.0	7.6	38.00	7.6	1.30	2.50	6.3	.....
19	.....	14.1	3.3	22.00	3.6	.90	2.50	5.4	.....
20	.....	10.6	3.1	30.00	3.6	.77	2.50	4.7	.....
21	.....	8.8	14.1	46.00	3.1	.90	3.10	4.7	.....
22	.....	8.2	7.6	78.00	2.5	.77	3.10	4.7	.....
23	.....	7.6	7.6	62.00	2.3	.77	3.10	4.0	.....
24	.....	7.2	10.6	3.60	2.8	1.17	3.10	4.0	.....
25	.....	6.3	22.0	3.60	2.8	1.04	3.10	2.8	.....
26	.....	5.8	26.0	.77	2.8	.90	3.10	2.8	.....
27	.....	5.8	60.0	14.10	2.3	1.17	3.60	2.5	.....
28	.....	6.3	50.0	3.60	2.3	1.17	14.10	2.5	.....
29	.....	5.8	49.0	30.00	2.5	1.17	14.10	2.3	.....
30	.....	11.3	78.0	3.60	7.6	.77	14.10	2.3	.....
31	.....	.....	38.0	.....	3.6	.77	.....	2.3	.....

a Estimated.

Daily discharge, in second-feet, of Sucker Creek at Gilchrist's ranch, Sask., 1909–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1917.									
1	.....	.....	52.0	7.7	3.30	0.61	1.30	1.50	.....
2	.....	.....	48.0	20.0	3.30	.61	1.30	1.50	.....
3	.....	.....	80.0	20.0	3.30	.61	1.50	1.50	.....
4	.....	.....	93.0	14.8	3.30	.61	1.50	1.50	.....
5	.....	.....	85.0	10.5	3.10	.71	1.70	1.70	.....
5	.....	.....	126.0	7.7	3.10	.71	1.70	1.70	.....
7	.....	.....	187.0	6.7	2.30	.71	1.50	1.70	.....
8	.....	.....	144.0	6.0	2.10	.61	1.50	1.70	.....
9	.....	.....	118.0	6.0	2.30	.61	1.50	1.90	.....
10	.....	.....	100.0	6.0	2.10	.61	1.50	1.90	.....
11	.....	.....	90.0	7.7	1.90	.61	1.70	2.10	.....
12	.....	.....	113.0	33.0	1.70	.61	1.50	2.10	.....
13	.....	.....	[a] 93.0	20.0	1.50	.71	1.50	2.10	.....
14	.....	213.0	[a] 73.0	7.7	1.30	.61	1.50	2.30	.....
15	.....	259.0	[a] 53.0	6.7	1.20	.61	1.70	2.30	.....
16	.....	125.0	33.0	5.4	1.10	.61	1.50	2.30	.....
17	.....	195.0	23.0	7.7	1.01	1.10	1.50	2.50	.....
18	.....	97.0	10.5	4.6	1.01	1.20	1.70	2.70	.....
19	.....	157.0	7.7	3.3	.91	1.30	1.50	2.90	.....
20	.....	240.0	7.0	3.3	.81	1.30	1.70	2.90	.....
21	.....	317.0	5.4	3.3	.81	1.50	1.50	3.30	.....
22	.....	258.0	5.4	3.6	.81	1.30	1.50	3.30	.....
23	.....	167.0	4.6	3.3	.71	1.50	3.30	3.30	.....
24	.....	86.0	13.9	3.1	.81	1.50	1.30	3.30	.....
25	.....	157.0	14.8	3.1	.61	1.70	1.30	3.30	.....
26	.....	54.0	13.1	2.9	.52	1.70	1.30	3.10	.....
27	.....	106.0	12.2	2.9	.52	1.70	1.30	3.10	.....
28	.....	38.0	10.5	2.3	.52	1.70	1.50	3.30	.....
29	.....	4.4	9.9	2.7	.52	1.30	1.50	3.30	.....
30	.....	31.0	7.7	2 7	.52	1.30	1.50	3.30	.....
31	.....	.....	7.7	.....	.52	1.30	.....	3.30	.....

[a] Estimated.

NOTE.—1911: Ice present Mar. 26–28.
1912: Stage-discharge relation affected by ice Apr. 1–4; discharge estimated.
1913: Between June 15 and 30 a small ditch, carrying about 0.30 second-foot of water, was taken out above gage rod.
1914: Stage-discharge relation affected by ice Mar. 15 to Apr. 7; channel frozen over Mar. 22–29.
1915: May 1–15, no gage-height records; discharge estimated.
1917: Apr. 14–18, ice going out; stage-discharge relation affected. Change in control May 2.

Monthly discharge of Sucker Creek at Gilchrist's ranch, Sask., 1909–1917.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1909.						
May 25–31	11.3	4.0	6.3	0.175	0.046	88
June 1–19, 22–30	255.0	2.3	29.0	.967	1.079	1,726
July	80.9	3.1	11.5	.318	.367	705
August	3.1	.45	1.25	.035	.040	77
September	4.	.75	2.03	.056	.063	121
October	2.6	2.	2.52	.070	.081	155
The period	.....	.....	.....	.....	1.676	2,872
1910.						
April	7.25	3.00	5.173	.144	.161	308
May	3.80	2.06	2.534	.070	.081	156
June	2.58	.40	1.426	.040	.044	85
July	1.70	.10	.739	.020	.023	45
August	5.45	.40	1.578	.044	.051	97
September	2.72	1.70	2.081	.058	.065	124
October	2.44	1.94	2.259	.063	.073	139
The period	.....	.....	.....	.....	.498	954

Monthly discharge of Sucker Creek at Gilchrist's ranch, Sask., 1909–1917—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1911.						
March 26–31	22.2	13.5	16.4	0.547	0.061	98
April	113.0	3.3	26.4	.880	.982	1,571
May	16.7	2.6	5.8	.193	.222	357
June	41.0	.3	3.7	.123	.137	220
July	10.1	.6	1.4	.047	.054	86
August	3.3	.9	1.4	.047	.054	86
September	15.5	.9	3.9	.130	.145	232
October	3.5	2.7	3.0	.100	.115	184
November 1	3.0	3.0	3.0	.100	.004	61
The period					1.774	2,895
1912.						
April	615	2.00	106.94	3.29	3.67	6,363
May	30	3.5	11.5	.349	.40	707
June	15.0	.80	3.18	.096	.11	189
July	3.0	.80	2.12	.064	.07	130
August	3.95	.80	2.48	.08	.09	152
September	4.40	.60	3.24	.10	.11	193
October	4.40	.05	3.48	.10	.12	214
November 1–15	3.50	.35	3.38	.10	.06	101
The period					4.63	8,049
1913.						
April	166.0	7.10	52.50	1.590	1.770	3,124
May	14.8	3.10	7.40	.224	.258	455
June	7.6	1.68	2.76	.084	.090	164
July	5.4	.66	1.89	.057	.065	116
August	2.6	.48	1.36	.041	.046	84
September	3.1	.25	1.57	.048	.054	93
October	2.8	2.00	2.21	.067	.077	136
The period					2.360	4,172
1914.						
March 15–31	54.00	.00	13.80	.460	.29	464
April	92.00	1.70	24.00	.793	.88	1,416
May	24.00	2.10	5.10	.171	.20	316
June	4.50	1.52	2.30	.078	.09	139
July	1.44	.12	.36	.011	.01	21
August	1.04	.13	.35	.012	.01	22
September	7.50	.44	1.17	.039	.04	70
October	7.50	1.36	3.00	.099	.11	183
The period					1.63	2,631
1915.						
March 23–31	6.6	5.1	6.0	.200	.07	107
April	102.0	6.6	16.7	.557	.62	994
May	9.2	1.9	6.1	.203	.23	375
June	10.5	1.6	5.1	.170	.19	304
July	7.5	1.6	3.8	.127	.15	234
August	4.5	2.0	2.8	.093	.11	172
September	17.2	4.0	4.1	.137	.15	244
October	17 2	2.0	4.3	.143	.16	264
The period					1.68	2,694
1916.						
April	28.0	5.80	13.30	.443	.49	791
May	78.0	3.10	18.10	.603	.70	1,113
June	78.0	.77	23.00	.767	.86	1,369
July	62.0	2.30	6.80	.227	.26	418
August	3.6	.77	1.35	.045	.05	83
September	14.1	.77	3.50	.117	.13	205
October	46.0	2.30	8.20	.273	.31	504
November 1–9	2.3	2.10	2.20	.073	.02	39
The period					2.82	4,522
1917.						
April 14–30	317.0	4.40	147.00	4.900	3.09	4,956
May	187.0	4.60	53.00	1.770	2.04	3,259
June	33.0	2.70	7.80	.260	.29	464
July	3.0	.52	1.53	.051	.06	94
August	1.7	.61	1.02	.034	.04	63
September	3.3	1.30	1.56	.052	.06	93
October	3.3	1.50	2.50	.083	.10	154
The period					5.68	9,083

Mean monthly discharge, in second-feet, of Sucker Creek at Gilchrist's ranch, Sask., 1909–1917.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total in acre-feet.
1909	.....	.....	[a]6.3	[b]29.00	11.50	1.25	2.00	2.5	.....	[a]2,872
1910	.....	5.2	2.5	1.43	.73	1.58	2.10	2.3	.....	954
1911	[a]16.4	26.0	5.8	3.70	1.40	1.40	3.90	3.0	[a]3.0	2,895
1912	.....	107.0	11.5	3.20	2.10	2.50	3.20	3.5	[a]3.4	8,049
1913	.....	52.0	7.4	2.80	1.89	1.36	1.57	2.2	.....	4,172
1914	[a]13.8	24.0	5.1	2.30	.36	.35	1.17	3.0	.....	2,631
1915	[a]6.0	16.7	6.1	5.10	3.80	2.80	4.10	4.3	.....	2,694
1916	.....	13.3	18.1	23.00	6.80	1.35	3.50	8.2	[a]2.2	4,522
1917	.....	[a]147.0	53.0	7.80	1.53	1.02	1.56	2.5	.....	9,083
Average	.....	35	13.7	8.7	3.3	1.52	2.6	3.5	2.2	4,375
Average run-off, acre-feet	.....	2,083	842	518	203	93	155	215	131	4,109
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	157

[a] Incomplete record not included in average. [b] Estimated.

BELANGER CREEK AT GARRISON'S RANCH, SASK.

LOCATION.—In SW. ¼ sec. 18, T. 7, R. 25 W. third meridian, 150 yards west of Garrison's ranch (Belanger post office) and about 27 miles south of Maple Creek.

DRAINAGE AREA.—43 square miles.

RECORDS AVAILABLE.—Open-water flow June 12, 1909, to November 15, 1912, and discharge measurements April, May, and June, 1913, when station was abandoned on account of the difficulty of obtaining a reliable observer.

GAGE.—Vertical staff; read by G. C. Garrison.

DISCHARGE MEASUREMENTS.—Made by wading. Measurements can not be made at extreme flood stage, as wading is impossible.

CHANNEL AND CONTROL.—Bed composed of sand and coarse gravel. Both banks fairly high but are overflowed at extreme flood stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 6.06 feet April 6, 1912 (discharge, 270 second-feet, estimated); minimum stage recorded, 1.55 feet June 7 to 10, 1912 (discharge 0.10 second-foot).

ACCURACY.—Stage-discharge relation permanent during low and ordinary stages. Owing to lack of high water measurements, records poor.

Discharge measurements of Belanger Creek at Garrison's ranch, Sask., 1909–1913.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1909.		*Feet.*	*Sec.-ft.*	1911.		*Feet.*	*Sec.-ft.*
June 12	H. R. Carscallen	1.55	8.86	June 15	G. H. Whyte	1.500	6.11
30	do	2.11	38.5	July 13	do	1.500	4.97
July 17	do	1.74	14.9	Aug. 16	do	1.420	3.49
Aug. 6	do	1.62	9.69	Sept. 20	do	1.405	3.43
26	do	1.515	6.44				
Sept. 25	do	1.445	4.72	1912.			
				May 23	J. S. Wright	2.18	10.61
1910.				June 13	do	2.11	8.49
Apr. 20	H. R. Carscallen	1.49	5.35	July 12	do	2.10	6.77
May 13	do	1.45	4.60	Aug. 9	do	2.04	4.57
June 2	do	1.45	4.20	Sept. 10	do	1.99	3.86
20	R. G. Swan	.....	3.17	Oct. 15	do	1.99	5.27
July 19	do	1.35	1.86	Nov. 13	do	1.98	3.18
Aug. 8	do	1.34	1.71				
20	do	1.31	1.90	1913.			
Sept. 20	do	1.30	1.33	Apr. 16	J. S. Wright	2.26	34.0
Oct. 19	do	1.28	1.01	May 21	E. W. W. Hughes	1.91	8.5
				June 28	do	2.01	4.8
1911.							
Apr. 20	G. H. Whyte	1.755	19.42				
May 18	do	1.540	6.08				

Daily discharge, in second-feet, of Belanger Creek at Garrison's ranch, Sask, 1909–1912.

Day.	June.	July.	Aug.	Sept.	Oct.	Day.	June.	July.	Aug.	Sept.	Oct.
1909.						1909.					
1	.....	45.4	4	4	4	16	6	18	6	4	4
2	.....	45.4	4	4	4	17	9	13	6	4	4
3	.....	45.4	4	4	4	18	30.8	13	6	4	4
4	.....	38	9	4	4	19	a 61.9	13	6	4	4
5	.....	38	9	4	4	20	a 296	9	6	4	4
6	.....	38	9	4	4	21	a 500	9	6	4	4
7	.....	30.8	9	4	4	22	a 82.5	9	6	5	5
8	.....	30.8	9	4	4	23	53.2	6	6	5	5
9	.....	53.2	7.5	4	4	24	38	6	6	5	6
10	.....	38	7.5	4	4	25	45.4	6	6	5	6
11	.....	38	7.5	4	4	26	38	4	6	5	6
12	9	38	6	4	4	27	38	4	6	5	6
13	7.5	38	6	4	4	28	38	4	6	5	6
14	6	24	6	4	4	29	38	4	6	4	6
15	6	18	6	4	4	30	38	4	4	4	6
						31	.....	4	4	.....	6

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1910.									
1	.....	2.8	5.7	5.7	2.80	1.35	1.35	1.27	.....
2	.....	2.8	5.7	5.7	2.80	1.35	1.35	1.27	.....
3	.....	5.7	5.7	9.2	2.80	1.35	1.35	1.27	.....
4	.....	5.7	5.7	7.4	2.80	1.35	1.35	1.27	.....
5	.....	5.7	5.7	5.7	2.80	1.35	1.35	1.27	.....
6	.....	9.2	5.7	5.7	2.80	5.70	1.35	1.27	.....
7	.....	9.2	5.7	5.7	2.80	2.80	1.35	1.27	.....
8	.....	9.2	5.7	5.7	2.80	1.35	1.35	1.19	.....
9	.....	5.7	5.7	5.7	2.80	1.35	1.35	1.19	.....
10	.....	5.7	5.7	5.7	2.80	1.35	1.35	1.19	.....
11	.....	5.7	5.7	5.7	2.80	1.35	1.35	1.19	.....
12	.....	5.7	5.7	5.7	2.80	1.35	1.35	1.19	.....
13	.....	9.2	5.7	5.7	2.80	2.80	1.35	1.11	.....
14	.....	9.2	5.7	5.7	2.80	1.35	1.35	1.11	.....
15	.....	9.2	5.7	5.7	2.80	1.35	1.35	1.11	.....
16	.....	9.2	5.7	5.7	2.80	1.35	1.35	1.11	.....
17	.....	5.7	5.7	5.7	1.85	1.35	1.35	1.11	.....
18	.....	5.7	5.7	5.7	1.85	1.35	1.35	1.11	.....
19	.....	5.7	5.7	5.7	1.85	1.35	1.35	1.11	.....
20	.....	5.7	5.7	5.7	1.85	1.35	1.35	1.11	.....
21	.....	5.7	5.7	5.7	1.85	1.35	1.35	1.11	.....
22	.....	5.7	5.7	5.7	1.35	1.35	1.35	1.11	.....
23	.....	5.7	5.7	5.7	1.35	1.35	1.35	1.11	.....
24	.....	5.7	5.7	5.7	1.35	1.35	1.35	1.11	.....
25	.....	5.7	5.7	5.7	1.35	1.35	1.35	1.11	.....
26	.....	5.7	5.7	5.7	1.35	1.35	1.35	1.11	.....
27	.....	5.7	5.7	2.8	1.35	1.35	1.35	1.11	.....
28	.....	5.7	5.7	2.8	1.35	1.35	1.35	1.11	.....
29	.....	5.7	5.7	2.8	1.35	1.35	1.35	1.11	.....
30	.....	5.7	5.7	2.8	1.35	1.35	1.35	1.11	.....
31	.....	.....	5.7	.....	1.35	1.35	.....	1.11	.....

a Estimated.

Daily discharge, in second-feet, of Belanger Creek at Garrison's ranch, Sask., 1909–1912—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1911.									
1		3.2					1.1	3.8	1.1
2		3.2					1.1	4.0	1.1
3		6.1					3.2	4.0	1.1
4		6.1					3.2	4.0	1.2
5		10.4					4.0	4.0	1.2
6		10.4					4.0	4.0	1.2
7		10.4					4.0	1.3	1.1
8		16.0					1.3	1.2	1.1
9		36.5					1.3	1.2	.9
10		43.5					1.5	1.2	.9
11		36.5					1.5	1.2	1.1
12		29.5					1.6	3.2	1.2
13		16.0				3.8	1.8	3.2	.9
14		16.0				3.7	1.8	3.2	1.1
15	75.0	16.0				3.6	1.8	3.8	1.1
16	57.5	16.0				3.5	1.8	4.3	1.1
17	36.5					3.8	1.9	4.3	1.1
18	36.5					4.0	1.9	3.8	1.2
19	43.5					4.0	1.8	3.8	.9
20	43.5					3.5	2.1	3.8	
21	29.5					3.5	3.0	4.3	
22	29.5					3.2	3.2	4.3	
23	22.6					3.2	3.2	4.3	
24	22.6					3.2	3.2	1.3	
25	10.4					3.0	3.2	1.3	
26	10.4					3.0	3.8	1.3	
27	6.1					1.2	3.5	1.3	
28	6.1					1.2	3.0	1.2	
29	6.1					1.2	3.0	1.2	
30	3.2					1.1	3.0	1.2	
31	3.2					1.1		1.1	
1912.									
1		10.0	1.40	1.40	0.25	1.62	3.41	3.22	3.03
2		10.0	1.40	.70	1.40	1.62	3.41	3.22	3.03
3		16.0	1.40	.70	1.16	1.73	3.03	3.22	3.03
4		235	1.40	.25	1.00	1.73	3.03	3.41	3.03
5		270	1.40	.25	1.00	1.84	3.22	3.41	3.22
6		270	1.40	.25	.76	1.84	3.03	3.41	3.22
7		232	5.67	.10	.46	1.95	3.03	3.60	3.03
8		232	8.90	.10	.46	1.23	3.60	3.60	3.22
9		212	8.90	.10	.52	4.68	3.60	3.60	3.22
10		166	6.03	.10	.52	1.95	3.41	3.87	3.41
11		203.5	1.73	.12	.58	1.95	3.87	3.60	3.41
12		58.00	2.65	.12	1.60	.88	3.87	3.60	3.60
13		19.00	2.65	1.32	.46	.82	3.87	3.22	3.22
14		6.03	2.65	2.84	.46	.88	3.60	3.22	3.60
15		5.67	1.40	8.90	.46	.82	3.60	3.41	3.60
16		6.03	1.40	4.95	.46	.82	3.60	3.41	
17		3.41	1.40	2.65	.12	.88	3.41	3.41	
18		3.41	1.40	1.73	.12	.88	3.41	3.41	
19		3.60	1.40	1.40	.12	.88	3.60	3.41	
20		3.60	1.40	1.40	.34	.82	3.60	3.41	
21		1.73	.70	1.08	.34	.82	3.87	3.41	
22		1.51	.70	.82	.70	1.62	3.87	3.41	
23		2.65	.70	.82	.76	1.84	3.87	3.41	
24		2.65	.25	.70	.82	3.60	3.41	3.22	
25		2.65	.25	.70	.76	3.60	3.41	3.22	
26		2.65	.25	.52	.76	3.41	3.41	3.22	
27		2.65	.25	.52	.88	3.41	3.60	3.22	
28		2.65	.25	.25	.88	3.60	3.41	3.22	
29		2.09	.25	.25	.88	3.60	3.41	3.22	
30		2.65	1.40	.25	.70	3.60	3.22	3.03	
31			1.40		.76	3.60		3.03	

NOTE.—1911: Gage not read between Apr. 16 and Aug. 13; no observer.
1912: Stage-discharge relation affected by ice Apr. 1–10.

Monthly discharge of Belanger Creek at Garrison's ranch, Sask., 1909–1912.

[Drainage area, 43 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1909.						
June 12–20, 22–30	500	6	71.0	1.630	1.189	2,641
July	53.2	4	22.1	.470	.542	1,358
August	9	4	6.3	.134	.154	387
September	5	4	4.2	.090	.100	252
October	6	4	4.6	.097	.112	282
The period					2.097	4,920
1910.						
April	9.20	2.80	6.32	.134	.150	376
May	5.70	5.70	5.70	.121	.140	350
June	9.20	2.80	5.49	.117	.130	327
July	2.85	1.35	2.18	.046	.053	134
August	5.70	1.35	1.91	.040	.046	117
September	1.35	1.35	1.35	.029	.032	80
October	1.27	1.11	1.16	.025	.029	71
The period					.580	1,455
1911.						
March 15–31	75.0	3.2	26.0	.605	.382	877
April 1–16	43.0	3.2	17.2	.400	.238	546
August 13–31	4.0	1.1	2.9	.067	.047	109
September	4.0	1.1	2.5	.058	.065	149
October	4.3	1.1	2.8	.065	.075	172
November 1–19	1.2	.9	1.1	.026	.018	41
The period					.825	1,894
1912.						
April	270	1.51	66.3	1.54	1.72	3,945
May	8.90	.25	2.01	.047	.054	124
June	8.90	.10	1.18	.027	.030	70
July	1.40	.12	.64	.015	.017	39
August	4.68	.82	2.02	.047	.054	124
September	3.87	3.03	3.49	.081	.090	208
October	3.87	3.03	3.36	.078	.090	207
November 1–15	3.60	3.03	3.26	.076	.04	97
The period					2.095	4,814

BELANGER CREEK AT OAKES'S RANCH, SASK.

LOCATION.—In NE. ¼ sec. 19, T. 6, R. 25 W. third meridian, about 35 miles south of the town of Maple Creek.

DRAINAGE AREA.—65 square miles.

RECORDS AVAILABLE.—Open water flow (incomplete records) April 1, 1912, to August 6, 1915, at station in SW. ¼ sec. 30, T. 6, R. 25 W. third meridian, and August 7, 1915, to October 31, 1917, at present station.

GAGE.—Vertical staff; read by J. D. Gilchrist. Stevens continuous water-stage recorder was installed in October, 1917, about half a mile upstream from old station.

DISCHARGE MEASUREMENTS.—Made by wading near gage. A cable was installed in October, 1917, 150 feet below the water-stage recorder (SW ¼ sec. 30, T. 6, R. 25, W. third meridian), from which measurements can be made during flood stages.

CHANNEL AND CONTROL.—Bed composed of gravel and stones bedded in clay. Right bank low; subject to overflow during high stages; left bank high and not subject to overflow. One channel at ordinary stages, two or more during high stages. Control is affected by beaver dams and is not permanent.

ICE.—Station not maintained during winter season.

DIVERSIONS.—There are several authorized irrigation projects on this stream and its tributaries above this station.

EXTREMES OF DISCHARGE.—1912–1917: Maximum stage recorded, 3.65 feet April 5, 1912 (discharge, 417 second-feet); minimum stage recorded, 0.20 foot September 6, 7 and 12 to 18, 1913 (discharge, 2.4 second-feet).

ACCURACY.—Stage-discharge relation affected by beaver dam. Rating curves poorly defined. Records considered poor.

Discharge measurements of Belanger Creek at Oakes's ranch, Sask., 1912–1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1912.		*Feet.*	*Sec.-ft.*	1914.		*Feet.*	*Sec.-ft.*
Mar. 30	M. H. French	.....	[a] 3.9	July 22	F. R. Steinberger	0.12	1.56
Apr. 1	do	1.30	[a] 4.93	Aug. 12	do	.13	1.32
3	do	1.65	[a] 8.18	31	E. W. W. Hughes	.19	1.62
5	do	3.65	416.59	Sept. 21	do	[d] .38	2.80
7	do	3.32	269.76	Oct. 18	do	[d] .30	3.90
22	do	.94	30.41				
23	do	.92	29.64	1915.			
May 22	J. S. Wright	.64	12.91	May 16	J. E. Caughey	.58	24.0
June 13	do	.52	11.37	June 17	do	.40	9.2
July 12	do	.54	10.41	July 16	do	.44	13.5
Aug. 9	do	.32	3.82	Aug. 7	do	3.75	[e] 7.2
Sept. 10	do	.54	4.52	27	do	3.39	[e] 5.0
Oct. 15	do	.55	6.11	Sept. 28	do	3.56	[e] 6.5
Nov. 13	do	.53	6.55	Oct. 18	do	3.37	[e] 7.4
				29	do	3.25	[e] 6.6
1913.							
Apr. 16	do	.98	42.0	1916.			
May 20	E. W. W. Hughes	.41	11.1	Apr. 6	M. H. French	4.69	9.2
June 23	do	.31	6.7	May 11	J. E. Caughey	3.37	11.0
26	do	.42	8.4	June 12	do	7.50	172.0
26	do	.43	[b] 7.9	July 12	do	3.87	12.6
July 26	do	.23	3.4	Sept. 2	L. B. P. Miles	1.69	8.7
Sept. 2	do	.24	3.1	Oct. 21	do	3.48	13.0
29	do	.27	3.8				
Oct. 30	do	.23	3.0	1917.			
Nov. 13	do	.22	2.9	Apr. 14	H. W. Rowley	7.25	[f] 60.0
				19	do	7.26	138.0
1914.				May 1	do	7.15	107.0
Mar. 16	M. H. French	2.47	[c] 70.00	25	do	5.14	29.0
21	do	1.01	5.20	July 7	do	3.45	[d] 13.6
May 9	F. R. Steinberger	.52	14.80	24	do	3.05	[d] 7.7
27	do	.40	7.20	Nov. 14	do	2.35	[b] 9.2
June 29	do	.28	4.30	16	do	2.54	[d] 5.1

[a] Ice present.
[b] Discharge measured one-fourth mile downstream in 1913.
[c] Estimated.
[d] Discharge affected by beaver dams during season.
[e] Discharge measured in sec. 30, T. 6, R. 25 W. 3.
[f] Ice going out.

Daily discharge, in second-feet, of Belanger Creek at Oakes's ranch, Sask., 1912–1917.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1912.								
1	78.0	19.6	a 12.0	7.5	a 7.5	a 3.0	6.2	5.8
2	78.0	17.8	a 12.0	7.5	.....	a 3.1	a 6.4	a 5.8
3	121.0	19.0	a 12.0	7.5	.....	a 3.3	a 6.6	5.8
4	446.0	19.0	a 12.0	7.5	.....	a 3.5	6.8	a 5.6
5	417.0	25.0	a 12.0	8.2	.....	a 3.7	a 6.8	a 5.5
6	362.0	28.0	a 11.0	9.2	.....	a 4.0	6.8	a 5.4
7	346.0	44.0	a 11.0	8.9	.....	a 4.3	a 7.0	a 5.3
8	336.0	70.0	a 11.0	9.6	.....	4.7	a 7.2	5.2
9	304.0	57.0	a 11.0	10.6	3.7	a 4.6	a 7.5	a 5.2
10	251.0	36.0	a 11.0	9.6	.....	4.5	7.8	5.2
11	238.0	31.0	a 11.0	9.6	.....	a 4.2	a 7.6	a 5.8
12	147.0	25.0	a 11.0	10.3	.....	a 4.0	a 7.4	a 6.2
13	92.0	19.0	11.0	10.6	.....	3.7	a 7.2	6.8
14	77.0	16.0	a 11.0	9.6	.....	a 3.7	7.2	a 6.0
15	75.0	16.0	a 12.0	8.9	.....	3.7	7.0	5.2
16	81.0	16.0	a 13.0	8.6	.....	a 3.8	6.2	.....
17	75.0	a 15.0	a 14.0	8.6	.....	a 4.0	6.5	.....
18	60.0	a 15.0	14.5	8.6	.....	a 4.2	a 6.8	.....
19	48.0	a 14.0	12.0	8.6	.....	a 4.6	a 7.0	.....
20	42.0	a 14.0	10.6	8.2	.....	a 4.8	7.2	.....
21	40.0	a 13.0	10.6	8.2	.....	5.0	7.0	.....
22	31.0	13.0	10.3	8.2	.....	a 5.2	a 7.0	.....
23	31.0	a 13.0	9.9	8.2	.....	a 5.4	7.0	.....
24	25.0	a 13.0	9.2	8.2	.....	5.5	7.0	.....
25	24.0	a 13.0	8.6	7.8	.....	a 5.0	6.8	.....
26	25.0	a 13.0	8.2	7.8	.....	4.8	6.8	.....
27	21.0	a 13.0	7.8	7.8	.....	a 5.0	6.5	.....
28	19.0	a 12.0	7.8	7.8	.....	a 5.5	a 6.4	.....
29	15.0	a 12.0	7.8	7.8	.....	6.2	a 6.3	.....
30	15.0	a 12.0	7.5	7.5	.....	a 6.2	6.2	.....
31	.....	a 12.0	.....	7.5	.....	.....	a 6.0	.....
1913.								
1	173.0	b 9.7	8.3	5.4	3.0	b 3.2	b 3.4	.....
2	170.0	8.8	7.8	b 7.9	b 3.0	3.2	3.4	.....
3	166.0	b 8.3	7.8	b 10.8	2.8	b 3.0	b 3.4	.....
4	169.0	b 7.8	7.4	13.7	b 2.8	2.6	3.4	.....
5	143.0	7.8	7.4	b 10.8	2.8	b 2.6	b 4.0	.....
6	b 143.0	b 8.3	b 7.4	b 7.6	b 3.6	b 2.4	4.8	.....
7	b 142.0	8.3	b 6.9	5.2	b 4.6	2.4	b 4.2	.....
8	142.0	b 8.8	6.5	3.8	5.4	b 2.6	b 4.0	.....
9	127.0	9.2	b 6.0	3.8	b 5.2	3.0	3.6	.....
10	b 117.0	b 9.2	5.6	b 5.2	5.2	b 2.8	b 3.4	.....
11	b 105.0	9.2	b 6.0	7.0	b 4.8	b 2.6	3.4	.....
12	b 93.0	b 9.7	b 6.9	b 7.9	4.6	2.4	3.4	.....
13	b 81.0	9.7	7.4	9.4	b 6.1	b 2.4	b 3.4	.....
14	b 68.0	b 12.9	b 6.9	b 8.6	b 7.6	b 2.4	b 3.2	.....
15	b 56.0	15.7	6.9	b 7.9	b 6.6	b 2.4	3.2	.....
16	42.0	b 14.3	b 6.9	b 7.6	b 6.1	2.4	3.2	.....
17	b 38.0	12.9	6.9	7.0	5.2	b 2.4	b 3.2	.....
18	b 35.0	b 12.4	7.4	6.6	b 5.4	2.4	3.4	.....
19	31.0	b 11.5	6.0	b 6.0	6.1	b 2.8	b 3.4	.....
20	28.0	11.1	b 6.5	b 5.4	b 5.4	3.0	3.6	.....
21	b 25.0	b 10.6	b 6.9	b 4.6	4.8	b 3.2	3.6	.....
22	b 22.0	b 10.7	b 7.4	4.0	b 4.2	b 3.2	b 3.4	.....
23	b 18.6	9.7	7.4	b 4.0	b 3.8	3.4	3.2	.....
24	15.2	b 9.7	b 8.8	b 3.8	3.2	b 4.0	3.2	.....
25	b 12.4	9.2	b 10.1	3.8	b 3.0	4.8	b 3.2	.....
26	b 9.7	8.3	11.1	3.2	2.8	b 4.6	3.2	.....
27	b 6.9	b 8.3	b 7.2	b 3.2	b 2.8	b 4.2	b 3.0	.....
28	4.7	8.8	b 6.6	3.2	2.6	b 4.0	2.8	.....
29	b 7.4	9.7	6.0	3.2	b 2.8	3.8	b 2.8	.....
30	10.1	b 9.2	b 5.8	b 3.2	b 3.0	b 3.6	b 2.8	.....
31	.....	b 8.8	.....	b 3.0	3.2	.....	b 2.8	.....

a Estimated. b Interpolated.

Daily discharge, in second-feet, of Belanger Creek at Oakes's ranch, Sask., 1912–1917—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1915.								
1	.....	.....	.....	17.8	6.2	5.8	6.2	.....
2	.....	.....	.....	22.0	6.2	7.6	6.3	.....
3	.....	.....	.....	26.0	6.4	7.6	6.7	.....
4	.....	.....	.....	26.0	6.4	7.2	6.9	.....
5	.....	.....	.....	26.0	6.2	7.2	7.0	.....
6	.....	.....	.....	35.0	6.2	7.2	7.2	.....
7	.....	.....	.....	35.0	7.6	7.6	7.3	.....
8	.....	.....	.....	36.0	7.6	8.0	7.3	.....
9	.....	.....	.....	44.0	7.5	7.6	7.0	.....
10	.....	.....	.....	43.0	7.5	7.6	6.8	.....
11	.....	.....	.....	39.0	7.7	7.6	7.0	.....
12	.....	.....	.....	39.0	8.0	7.6	7.0	.....
13	.....	.....	.....	36.0	8.0	8.0	7.2	.....
14	.....	.....	.....	35.0	8.0	8.0	7.2	.....
15	.....	.....	.....	[a] 26.0	7.8	7.6	7.1	.....
16	.....	.....	.....	12.5	7.8	7.6	7.3	.....
17	.....	.....	12.0	12.0	7.6	6.8	[a] 7.3	.....
18	.....	.....	18.5	11.0	7.6	6.8	7.4	.....
19	.....	.....	22.0	11.0	8.6	6.8	[a] 7.3	.....
20	.....	.....	22.0	10.1	8.4	6.8	[a] 7.3	.....
21	.....	.....	21.0	9.8	9.2	6.4	[a] 7.1	.....
22	.....	.....	17.8	9.1	7.2	6.4	[a] 7.0	.....
23	.....	.....	16.2	8.7	6.8	6.8	[a] 6.9	.....
24	.....	.....	14.5	9.1	6.4	6.8	[a] 6.8	.....
25	.....	.....	12.5	9.1	5.8	6.8	[a] 6.7	.....
26	.....	.....	10.5	10.1	5.8	6.4	[a] 6.7	.....
27	.....	.....	14.5	9.8	5.2	6.3	[a] 6.7	.....
28	.....	.....	17.8	9.1	[a] 5.2	6.2	[a] 6.6	.....
29	.....	.....	17.8	9.1	[a] 5.2	6.2	6.6	.....
30	.....	.....	17.8	8.3	5.2	6.3	[a] 6.6	.....
31	.....	.....	.....	6.9	5.2	.....	[a] 6.6	.....
1916.								
1	[b] 10.0	.....	26.0	13.3	20.0	13.0	12.0	.....
2	[b] 9.0	.....	22.0	13.3	19.6	8.5	13.0	.....
3	[b] 8.0	.....	13.9	15.3	18.9	8.5	13.3	.....
4	[b] 9.2	.....	13.9	17.9	17.9	8.5	12.8	.....
5	[b] 9.2	.....	21.0	16.9	17.3	8.5	12.2	.....
6	9.2	.....	20.0	16.6	16.8	8.5	12.8	.....
7	14.1	.....	17.1	16.0	16.4	8.5	13.1	.....
8	19.0	.....	15.3	15.3	16.4	8.6	14.0	.....
9	18.8	.....	[b] 15.0	15.4	16.8	8.6	14.0	.....
10	17.7	.....	14.6	15.4	16.9	8.6	13.8	.....
11	14.8	10.6	32.0	15.4	16.7	8.6	13.5	.....
12	14.1	[b] 10.5	50.0	12.6	16.6	8.6	13.4	.....
13	13.8	[b] 10.5	39.0	12.6	16.5	8.5	13.1	.....
14	13.5	10.4	22.0	12.3	16.5	8.5	13.0	.....
15	14.5	10.5	22.0	12.3	16.4	8.5	12.7	.....
16	14.1	10.5	21.0	12.3	16.4	8.5	12.7	.....
17	13.8	10.5	21.0	14.6	16.0	11.4	12.6	.....
18	13.7	11.0	19.0	16.4	15.6	11.6	12.6	.....
19	13.7	11.2	18.8	15.6	15.6	11.6	12.6	.....
20	13.6	13.3	18.8	15.6	15.3	11.8	12.6	.....
21	13.4	15.4	22.0	15.6	14.6	11.8	10.9	.....
22	13.2	15.4	23.0	15.6	14.2	11.8	10.9	.....
23	17.7	17.0	24.0	15.4	14.1	12.2	10.9	.....
24	18.8	17.9	22.0	15.3	13.7	12.0	10.9	.....
25	22.0	21.0	21.0	15.0	13.3	12.0	10.9	.....
26	23.0	22.0	21.0	15.0	13.0	14.6	10.8	.....
27	31.0	30.0	21.0	32.0	13.0	13.3	10.8	.....
28	35.0	34.0	21.0	33.0	13.0	12.8	10.7	.....
29	35.0	34.0	13.3	32.0	13.0	12.3	10.6	.....
30	.....	32.0	15.3	22.0	13.0	12.0	10.6	.....
31	.....	22.0	.....	21.0	13.0	.....	10.5	.....

[a] Interpolated. [b] Estimated.

Daily discharge, in second-feet, of Belanger Creek at Oakes's ranch, Sask., 1912–1917—Continued.

Day.	June.	July.	Aug.	Sept.	Oct.	Day.	June.	July.	Aug.	Sept.	Oct.
1917.						1917.					
1	.....	11.8	10.0	9.5	9.3	16	15.4	11.0	9.7	9.5	9.3
2	.....	11.8	10.0	9.5	9.4	17	15.0	10.8	9.7	9.4	9.3
3	.....	11.6	9.9	9.5	9.4	18	14.0	10.8	9.7	9.4	9.3
4	.....	11.6	9.9	9.5	9.3	19	13.6	10.8	9.7	9.4	9.3
5	25.0	11.5	9.9	9.5	9.3	20	13.6	10.8	9.7	9.4	9.3
6	24.0	11.4	9.9	9.5	9.3	21	13.3	10.7	9.6	9.4	9.3
7	23.0	11.8	9.9	9.5	9.3	22	13.2	10.7	9.6	9.4	9.3
8	22.0	11.4	9.9	9.5	9.4	23	13.1	10.7	9.6	9.4	9.3
9	22.0	11.8	9.8	9.5	9.3	24	13.1	10.2	9.6	9.6	9.3
10	22.0	11.6	9.9	9.5	9.3	25	13.0	10.6	9.6	9.5	9.3
11	22.0	11.6	9.8	9.5	9.3	26	12.9	10.4	9.6	9.5	9.3
12	21.0	11.4	9.8	9.5	9.3	27	11.6	10.4	9.6	9.3	9.3
13	18.3	11.3	9.8	9.5	9.3	28	11.4	10.3	9.6	9.3	9.3
14	16.3	11.3	9.7	9.5	9.4	29	11.4	10.3	9.6	9.3	9.3
15	20.0	11.1	9.7	9.5	9.3	30	11.2	10.2	9.5	9.3	9.3
						31	.....	10.2	9.5	.....	9.3

NOTE.—1912: Shifting control June 1 to Aug. 1 and Sept. 1 to Nov. 15. Record very incomplete and determinations are roughly approximate.
1913: Apr. 1, stage-discharge relation affected by ice.
1914: No records.
1915: New station established Aug. 7.
1916: Gage not read May 1–10.
1917: Unable to obtain observer previous to June 5.

Monthly discharge of Belanger Creek at Oakes's ranch, Sask., 1912–1917.

[Drainage area, 65 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1912.						
April	446.0	15.0	131.0	2.050	2.29	7,795
May	70.0	a 12.0	21.0	.328	.38	1,291
June	14.5	a 7.5	10.8	.169	.19	643
July	10.6	a 7.5	8.5	.133	.15	523
August	.....	.....	a 3.0	.047	.05	184
September	a 6.2	a 3.0	4.4	.069	.08	262
October	7.8	a 6.0	6.8	.106	.12	418
November 1–15	6.8	5.2	5.7	.089	.05	170
The period	.....	.....	.....	.....	3.31	11,286
1913.						
April	173.0	4.7	73.4	1.150	1.280	4,368
May	15.7	7.8	9.9	.155	.179	610
June	11.1	5.6	7.2	.113	.126	429
July	13.7	3.0	6.0	.094	.108	371
August	7.6	2.6	4.3	.067	.077	263
September	4.8	2.4	3.1	.048	.054	182
October	4.8	2.8	3.4	.053	.061	208
The period	.....	.....	.....	.....	1.885	6,431
1915.						
June 17–30	22.0	10.5	16.8	.258	.13	452
July	44.0	6.9	21.0	.323	.37	1,291
August	9.2	5.2	6.9	.106	.12	424
September	8.0	5.8	7.1	.109	.12	422
October	7.4	6.2	6.9	.106	.12	424
The period	.....	.....	.....	.....	.86	4,013

a Estimated.

Monthly discharge of Belanger Creek at Oakes's ranch, Sask., 1912–1917—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1916.						
April	35.0	8.0	16.3	0.251	0.28	938
May 11–31	34.0	10.4	17.6	.271	.31	733
June	50.0	13.3	22.0	.388	.38	1,309
July	33.0	12.3	17.0	.262	.30	1,045
August	20.0	13.0	15.7	.242	.28	965
September	14.6	8.5	10.4	.160	.18	619
October	14.0	10.5	12.2	.188	.22	750
The period	.....	.....	.....	.....	1.95	6,359
1917.						
June 5–30	25.0	11.2	16.6	.255	.24	856
July	11.8	10.2	11.0	.169	.19	676
August	10.0	9.5	9.7	.149	.17	596
September	9.5	9.3	9.4	.145	.16	559
October	9.4	9.3	9.3	.143	.16	572
The period	.....	.....	.....	.....	.92	3,259

Mean monthly discharge, in second-feet, of Belanger Creek at Oakes's ranch, Sask., 1909–1917.

[Drainage area, 65 square miles.]

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total in acre-feet.
1909	.....	.....	.....	[a] 71.0	22.0	6.30	4.20	4.60	.....	[a] 49.55
1910	.....	6.3	5.7	5.5	2.2	1.91	1.35	1.16	.....	14.55
1911	[a]26.0	[a] 17.2	.....	.....	.....	[a] 2.90	2.50	2.80	[a] 1.10	[a] 1,894
1912	.....	131.0	21.0	10.8	8.5	[b] 3.00	4.40	6.80	[a] 5.70	11,286
1913	.....	73.0	9.9	7.2	6.0	4.30	3.10	3.40	.....	6,431
1914	.....	.....	.....	.....	.....	.....	.....	.....	.....	(c)
1915	.....	.....	.....	[a] 16.8	21.0	[b] 6.90	7.10	6.90	.....	[a] 4,013
1916	.....	16.3	[a] 17.6	22.0	17.0	15.70	10.40	12.20	.....	6,359
1917	.....	.....	.....	[b] 18.0	11.0	9.70	9.40	9.30	.....	[a] 3,474
Average	.....	57	12.2	12.7	12.5	6.8	5.3	5.9	.....	6,383
Average run-off, acre-feet	.....	33.92	750	756	769	418	315	363	.....	6,763
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	104

[a] Incomplete record not included in average.
[b] Estimated.
[c] No records for 1914.

NOTE.—Records prior to 1912 taken at Garrison's ranch on sec. 18, T. 7, R. 25, W. third meridian.

LONEPINE CREEK AT HEWITT'S RANCH, SASK.

LOCATION.—In the NW. ¼ sec. 27, T. 7, R. 26 W. third meridian, about 2 miles west of the surveyed trail from Belanger post office to Maple Creek and about 4 miles west of Belanger post office.

DRAINAGE AREA.—8 square miles.

RECORDS AVAILABLE.—July 17, 1909, to October 31, 1914, when station was discontinued.

GAGE.—Vertical staff; read by S. W. Hewitt.

DISCHARGE MEASUREMENTS.—Made with current meter in flood stages and by weir at other stages.

CHANNEL AND CONTROL.—Bed sand and coarse gravel. Right bank high; not subject to overflow, left bank low and subject to overflow. One channel at all stages.

EXTREMES OF DISCHARGE.—1909–1914. Maximum stage recorded 2.40 feet April 27, 1911 (discharge, 12.9 second-feet); minimum stage recorded, 0.15 foot September 7, 1913 (discharge, 0.23 second foot).

ICE.—Observations discontinued during winter season.

DIVERSIONS.—Messrs. A. McDonald and S. W. Hewitt divert water for irrigation above the gage.

ACCURACY.—Stage-discharge relation not permanent. Gage read once daily to hundredths during open water period. Record poor.

REMARKS.—Station discontinued October 31, 1914.

Discharge measurements of Lonepine Creek at Hewitt's ranch, Sask., 1908–1914.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1908.		*Feet.*	*Sec.-ft.*	1912.		*Feet.*	*Sec.-ft.*
Aug. 17	F. T. Fletcher	.....	0.61	May 23	J. S. Wright	1.78	2.38
17	do	.....	.63	June 13	do	1.43	1.14
				July 12	do	1.61	.531
1909.				Aug. 9	do	1.30	.768
July 17	H. R. Carscallen	1.70	2.26	Sept. 10	do	1.29	.762
Aug. 6	do	1.39	1.18	Oct. 16	do	1.37	.948
26	do	1.24	.63	Nov. 13	do	1.41	1.25
Sept. 28	do	1.285	.81				
				1913.			
1910.				Apr. 15	J. S. Wright	2.55	6.10
Apr. 20	H. R. Carscallen	1.35	1.72	May 21	E. W. W. Hughes	2.07	2.10
May 13	do	1.29	1.23	June 28	do	1.52	*a*.95
June 2	do	1.05	.51	July 26	do	1.48	*a*.78
July 19	R. G. Swan	1.03	.34	Sept. 4	do	.17	*a*.28
Aug. 30	do	1.16	.46	29	do	.34	*a*.79
Sept. 20	do	1.18	.45	Nov. 14	do	.22	*a*.75
Oct. 19	do	1.28	1.07				
				1914.			
1911.				May 11	F. R. Steinberger	.58	1.57
Apr. 20	G. H. Whyte	1.395	4.30	28	do	.40	.99
May 18	do	1.150	2.14	June 23	do	.22	.42
June 15	do	.620	.33	30	do	.25	.50
July 13	do	.830	*a*.76	Aug. 12	do	.22	.42
Aug. 15	do	.820	*a*.84	31	E. W. W. Hughes	.21	.39
Sept. 20	do	.950	*a*1.18	Sept. 21	do	.32	.72

a Weir measurement.

Daily discharge, in second-feet, of Lonepine Creek at Hewitt's ranch, Sask., 1909–1914.

Day.	July.	Aug.	Sept.	Oct.	Day.	July.	Aug.	Sept.	Oct.
1909.					1909.				
1	.....	1.33	0.72	0.72	16	.....	0.72	0.85	1.16
2	.....	1.33	.72	.72	17	2.26	.72	.72	1.00
3	.....	1.16	.72	.72	18	2.47	.72	.85	1.00
4	.....	1.16	.72	.85	19	2.26	.72	1.00	1.00
5	.....	1.16	.72	.85	20	1.69	.72	.85	1.00
6	.....	1.00	.72	.85	21	1.51	.72	.85	1.00
7	.....	1.00	.72	1.00	22	1.69	.72	.85	1.00
8	.....	1.51	.72	1.00	23	1.60	.72	.85	1.00
9	.....	1.16	.72	1.00	24	1.60	.72	.85	1.00
10	.....	1.00	.72	1.00	25	1.60	.72	.85	1.00
11	.....	.85	.85	1.00	26	1.69	.72	.85	1.00
12	.....	.85	.72	1.00	27	1.79	.72	.85	1.00
13	.....	.85	.85	1.00	28	2.07	.72	.72	1.00
14	.....	.85	.85	1.00	29	2.07	.72	.72	1.16
15	.....	.85	.85	1.00	30	1.69	.72	.72	1.16
					31	1.51	.72	.....	1.16

Daily discharge, in second-feet, of Lonepine Creek at Hewitt's ranch, Sask., 1909–1914—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1910.								
1	1.30	1.30	0.24	0.46	0.59	0.59	0.73	.....
2	1.30	1.30	.37	.37	.59	.59	.73	.....
3	1.30	1.30	2.80	.37	.37	.59	.73	.....
4	1.30	1.30	2.80	.37	.37	1.72.	.77	.....
5	1.30	1.30	2.80	.37	.59	1.72	.77	.....
6	1.30	1.00	1.30	.37	.59	1.72	.77	.....
7	1.30	1.00	1.72	.37	.59	1.72	.77	.....
8	1.72	1.00	1.72	.37	.59	1.00	.77	.....
9	2.24	1.00	1.72	.37	.59	1.00	.77	.....
10	2.24	1.00	a.24	.37	.59	1.00	.77	.....
11	2.24	1.30	a.59	.37	.59	1.00	.77	.....
12	1.72	1.30	a.59	.37	.59	1.00	.77	.....
13	2.80	1.18	a.24	.37	.59	1.00	.77	.....
14	2.80	1.00	a.24	.37	.59	1.00	.77	.....
15	1.72	2.80	a.24	.37	.59	1.00	.77	.....
16	1.72	2.80	a.24	.37	.59	.59	.77	.....
17	1.72	2.24	.37	.37	.59	.59	.77	.....
18	1.72	2.24	.37	.37	.59	.59	1.30	.....
19	1.72	2.24	.37	.37	.59	.59	1.12	.....
20	1.72	2.24	.37	.37	.59	.70	1.12	.....
21	1.72	1.30	.37	.37	.59	.73	1.12	.....
22	1.72	1.30	.37	.37	.59	.70	1.00	.....
23	1.72	1.30	.37	.59	.59	.70	.95	.....
24	1.30	1.00	.37	.59	.59	.73	.91	.....
25	1.30	a.24	.37	.59	.59	.73	.95	.....
26	1.30	a.24	.37	.59	.59	.73	.95	.....
27	1.30	a.24	a.24	.59	.59	.73	.95	.....
28	1.30	.37	a.24	.59	.59	.73	1.00	.....
29	1.30	.37	.30	.59	.59	.73	1.00	.....
30	1.30	.24	.37	.59	.59	.73	.95	.....
31	.....	.24	.....	.59	.59	.....	.95	.....
1911.								
1	.....	4.7	1.4	.9	.6	.5	1.2	.....
2	.....	4.3	1.2	5.7	.6	.5	1.2	.....
3	.....	4.3	1.0	1.5	.6	.5	4.6	.....
4	.....	4.7	2.0	1.0	.6	1.8	1.7	.....
5	.....	4.7	5.9	.9	.7	6.7	1.4	.....
6	.....	3.9	3.1	.9	7.0	7.3	1.4	.....
7	.....	2.8	3.1	.9	3.8	3.5	1.4	.....
8	.....	2.9	2.6	.9	3.8	1.8	1.2	.....
9	.....	2.9	2.2	1.0	.9	1.0	1.2	.....
10	.....	3.5	1.0	.9	.9	.9	1.2	.....
11	.....	3.3	.5	.9	.8	.9	1.2	.....
12	.....	2.8	.5	.8	.7	.8	1.2	.....
13	.....	2.2	.4	.8	.7	1.0	1.2	.....
14	2.1	2.3	.3	.8	.7	.9	1.2	.....
15	2.4	2.7	.3	.7	.7	.9	1.0	.....
16	2.4	7.1	.3	.7	.6	.8	1.0	.....
17	2.4	4.3	.2	.6	.6	1.5	1.4	.....
18	2.4	2.4	.3	.8	.6	1.7	2.3	.....
19	4.7	4.7	.3	.9	.6	1.7	2.4	.....
20	3.7	3.0	.3	.8	.5	1.5	2.4	.....
21	3.5	2.4	.3	.7	.9	1.7	2.4	.....
22	3.9	5.9	1.8	.7	.6	1.7	2.4	.....
23	3.9	3.6	1.8	1.2	.6	1.4	2.4	.....
24	4.6	3.0	1.8	.8	.5	1.4	2.4	.....
25	4.6	3.8	8.0	.7	.5	1.3	3.0	.....
26	3.9	3.5	5.2	.6	1.2	1.3	3.0	.....
27	12.9	2.4	1.5	.8	.6	1.3	.....	.....
28	11.1	3.1	1.5	.6	.5	1.2	.....	.....
29	9.3	2.0	.9	.6	.5	1.2	.....	.....
30	7.5	1.8	.9	.6	.5	1.2	.....	.....
31	.....	1.5	.....	.6	.5	.....	.....	.....

[a] Water being used for irrigation above gage rod.

Daily discharge, in second-feet, of Lonepine Creek at Hewitt's ranch, Sask., 1909–1914—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1912.								
1	.....	2.71	2.67	0.65	1.21	0.89	0.87	2.27
2	.....	2.71	1.97	.65	1.34	.79	.87	1.18
3	.....	2.75	1.97	.65	1.63	.79	.87	1.02
4	.....	2.75	2.12	.53	1.85	.79	.87	2.27
5	.....	3.03	2.12	.55	2.10	.79	.87	1.18
6	.....	3.32	2.12	.55	2.70	.79	.87	1.05
7	.....	3.32	1.97	.77	2.20	.79	.87	1.18
8	.....	3.20	1.89	.87	1.70	.79	87	1.05
9	.....	3.32	1.97	4.60	1.24	.79	1.34	.89
10	.....	3.24	1.97	2.67	.87	.79	1.18	.89
11	.....	3.20	1.93	2.67	.55	.79	1.05	1.89
12	.....	3.16	1.93	1.74	.75	.79	1.02	.89
13	.....	3.07	1.89	2.67	.75	.79	1.02	.89
14	3.07	2.47	1.89	2.70	.75	.79	.97	.89
15	3.32	2.43	2.23	2.70	.75	1.34	.97	.89
16	3.07	2.23	2.23	2.70	3.53	.89	.92	.....
17	3.49	2.23	2.20	2.70	3.53	.82	.89	.....
18	3.49	2.23	1.78	2.70	3.53	.79	1.02	.....
19	3.32	2.16	1.78	2.70	3.49	1.34	.99	.....
20	3.32	2.16	1.74	1.02	1.52	.89	.97	.....
21	3.32	2.12	1.52	1.02	1.34	.79	.97	.....
22	3.07	2.43	1.52	1.02	1.41	.89	.97	.....
23	2.87	2.47	.94	1.18	1.34	1.02	.99	.....
24	2.87	2.31	.77	1.02	1.34	1.02	.99	.....
25	2.67	2.31	.65	1.02	.84	.89	.99	.....
26	2.67	2.31	.65	1.18	.77	.89	1.02	.....
27	2.67	3.20	.65	1.02	1.34	.87	1.05	.....
28	2.67	4.10	.65	1.21	.65	.87	1.05	.....
29	2.67	3.07	.65	1.21	1.34	.87	1.05	.....
30	2.71	2.75	.65	1.21	.84	.87	2.27	.....
31	.....	2.71	.....	1.21	.84	.....	2.27	.....
1913.								
1	.....	a 1.96	1.34	a .82	a .71	.40	a .82	.....
2	.....	a 1.96	1.34	1.35	a.52	.40	a.85	.....
3	.....	a 1.96	a 1.34	a 1.35	.35	a.35	a.89	.....
4	.....	1.99	1.34	a 1.31	a.61	.28	a.92	.....
5	.....	a 1.99	a 1.11	1.31	.96	a.25	.96	.....
6	2.70	a 1.99	a.92	a 1.31	.82	a.25	.96	.....
7	5.20	1.99	a.82	a.96	a.82	.23	.96	.....
8	13.20	2.20	.73	a.78	a.82	.25	a.96	.....
9	14.40	a 2.20	.73	.64	a.82	.33	a.96	.....
10	6.30	a 2.20	.73	a.82	.82	a.35	a.96	.....
11	13.20	a 2.10	a.73	2.40	.75	a.40	a.96	.....
12	13.50	2.10	a.73	a 1.56	.75	a.46	.96	.....
13	5.20	a 2.40	a.73	1.03	a.78	a.52	.96	.....
14	8.60	a 2.40	a.73	a.99	a.82	a.58	.96	.....
15	6.00	2.80	a.73	.96	a.85	a.64	a.96	.....
16	3.40	3.30	a.73	.96	a.89	a.71	a.96	.....
17	3.40	2.70	.73	a.96	a.92	a.78	a.96	.....
18	3.40	2.30	.71	a.96	.96	.82	a.96	.....
19	2.90	a 2.20	.71	a.96	.82	.78	.99	.....
20	2.40	a 2.10	a.82	.96	.82	.64	.96	.....
21	a 2.20	1.93	a.92	a 1.13	a.68	.49	.96	.....
22	2.10	1.90	1.04	1.27	a.55	a.64	a.96	.....
23	2.00	a 1.73	1.11	a 1.17	a.43	1.96	a.99	.....
24	1.76	a 1.57	1.50	a 1.06	.38	a 1.56	a 1.03	.....
25	1.76	a 1.44	a 1.40	a.96	.35	a 1.17	a 1.06	.....
26	1.63	1.38	a 1.32	.78	.35	.82	1.10	.....
27	1.90	1.38	a 1.21	a.85	a.35	a.78	1.10	.....
28	1.90	a 1.38	1.15	.96	a.35	.78	1.10	.....
29	2.10	a 1.36	a 1.15	.92	a.38	.78	a 1.06	.....
30	1.96	a 1.34	a 1.15	a.82	a.38	.78	a 1.03	.....
31	.....	1.34	.....	.71	.40	.....	a.99	.....

a Interpolated.

Daily aischarge, in second-feet, of Lonepine Creek at Hewitt's ranch, Sask., 1909–1914—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1914.								
1	.....	1.10	a 0.62	a 0.47	a 0.31	0.42	a 0.50	.....
2	.....	a 1.06	.65	a. 44	.31	a. 42	a. 50	.....
3	.....	a. 99	a. 65	a. 42	.31	.44	a. 50	.....
4	.....	.96	a. 65	a. 39	.31	.42	.99	.....
5	.....	1.06	a. 65	.36	a. 34	a. 47	.89	.....
6	.....	.96	.65	.36	a. 36	.53	.92	.....
7	.....	.96	.56	.36	a. 39	a. 53	a. 99	.....
8	.....	1.28	.62	a. 39	.42	a. 53	a 1.10	.....
9	.....	a 1.28	.59	a. 44	.56	a. 53	a 1.21	.....
10	.....	1.31	a. 59	a. 50	a. 50	a. 53	a 1.28	.....
11	.....	1.67	a. 62	a. 56	a. 44	a. 53	1.35	.....
12	.....	1.67	a. 62	.59	.42	a. 53	1.17	.....
13	6.70	1.67	a. 65	.62	a. 36	1.75	.99	.....
14	3.40	1.67	.65	.65	.34	1.39	a. 99	.....
15	a 3.40	1.67	a. 59	a. 59	a. 34	.99	a. 99	.....
16	3.20	1.63	a. 53	a. 53	.34	a. 99	a. 99	.....
17	a 4.30	1.63	a. 47	a. 47	.34	a. 99	a. 99	.....
18	6.10	1.28	a. 42	a. 42	a. 34	a. 99	.99	.....
19	3.20	a 1.28	.36	.36	.79	a. 99	.82	.....
20	a 3.30	a 1.28	.36	.42	a. 65	.99	.72	.....
21	3.30	1.28	.56	a. 42	a. 53	.72	a. 72	.....
22	3.30	a 1.28	.53	a. 42	a. 42	a. 68	a. 72	.....
23	3.30	a 1.24	.36	.42	.34	a. 65	a. 72	.....
24	a 2.20	1.24	a. 39	a. 39	.82	.65	a. 72	.....
25	1.24	.99	a. 42	a. 36	.50	a. 59	.75	.....
26	1.21	.82	a. 44	.36	a. 50	a. 56	.75	.....
27	1.21	a. 79	a. 47	.36	a. 47	.50	.75	.....
28	1.17	a. 72	.47	.36	a. 47	.50	a. 75	.....
29	1.21	a. 65	.44	a. 36	a. 44	.50	a. 75	.....
30	1.17	a. 62	.50	a. 34	.42	a. 50	a. 75	.....
31	.....	.59	.....	a. 34	.39	.....	a. 75	.....

a Interpolated.

NOTE.—1911: Oct. 27, stream frozen.
1912: Apr. 1–13, stage-discharge relation affected by ice; data inadequate for determination of discharge. June 23, water diverted above station for irrigation; no information as to date at which ditch was closed.
1913: Ice present until Apr. 5. July 1 to Oct. 31, gage heights read on permanent weir.

Monthly discharge of Lonepine Creek at Hewitt's ranch, Sask., 1909–1914.

[Drainage area, 8 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1909.						
July 17–31	2.47	1.51	1.83	0.458	0.255	54
August	1.51	.72	.89	.220	.254	55
September	1.00	.72	.79	.200	.223	47
October	1.16	.72	.98	.245	.272	60
The period	.....	.....	.....	.....	.....	216
1910.						
April	2.80	1.30	1.65	.412	.460	98
May	2.80	.24	1.22	.304	.351	75
June	2.80	.24	.743	.185	.206	44
July	.59	.37	.404	.101	.116	25
August	.59	.37	.576	.144	.166	35
September	1.72	.59	.898	.224	.258	53
October	1.30	.73	.878	.220	.254	60
The period	.....	.....	.....	.....	.....	390

Monthly discharge of Lonepine Creek at Hewitt's ranch, Sask., 1909–1914—Contd.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1911.						
Apr. 14–30	12.9	2.1	5.020	0.628	0.400	169
May	7.1	1.5	3.440	.430	.496	211
June	8.0	.3	1.690	.211	.235	101
July	5.7	.6	.917	.122	.141	60
August	7.0	.5	1.060	.132	.152	65
September	7.3	.5	1.660	.208	.232	99
October 1–26	4.6	1.0	1.820	.228	.220	94
The period					1.876	799
1912.						
Apr. 14–30	3.49	2.67	3.02	.38	.24	102
May	4.10	2.12	2.76	.34	.39	170
June	2.67	.65	1.63	.20	.22	97
July	4.60	.53	1.58	.197	.23	97
August	3.53	.55	1.55	.194	.22	95
September	1.34	.79	.87	.11	.12	52
October	2.27	.87	1.06	.13	.15	65
Nov. 1–15	2.27	.89	1.23	.15	.08	837
The period					1.65	715
1913.	10.40	1.63	6.720	.840	.781	413
May	3.30	1.34	1.990	.248	.286	122
June	1.50	.71	.990	.123	.137	59
July	2.40	.64	1.060	.132	.152	65
August	.96	.35	.652	.082	.094	40
September	1.96	.23	.639	.080	.089	38
October	1.10	.82	.976	.122	.141	60
The period					1.680	797
1914.						
Apr. 13–30	6.70	1.17	2.90	.370	.25	105
May	1.67	.59	1.18	.147	.17	73
June	.65	.36	.54	.067	.08	32
July	.65	.34	.44	.054	.06	27
August	.79	.31	.44	.054	.06	27
September	1.75	.42	.69	.087	.10	41
October	1.35	.50	.87	.109	.13	54
The period					.85	359

Mean monthly discharge, in second-feet, of Lonepine Creek at Hewitt's ranch, Sask., 1909–1914.

Year.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total in acre-feet.
1909	.....	.....	.....	[a] 1.83	0.89	0.79	0.98	.....	[a] 216
1910	1.65	1.22	0.74	.40	.58	.90	.88	.....	390
1911	[b] 2.80	3.40	1.69	.92	1.06	1.66	[c] 1.82	.....	799
1912	[c] 3.00	2.80	1.63	1.58	.155	.87	1.06	[a] 1.23	792
1913	[b] 4.10	1.99	.99	1.06	.65	.64	.98	.....	628
1914	[c] 2.90	1.18	.54	.44	.44	.69	.87	.....	427
Average	2.90	2.1	1.12	.88	.86	.92	1.10	.....	607
Average run-off, acre-feet	173	129	67	54	53	55	68	.....	599
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	75

[a] Incomplete record not included in average.
[b] Reduced to monthly average.
[c] Average for part of month assumed as monthly average.

NOTE.—Mean for April, 1913, and total for 1913 revised since publication of 1913 report.

DAVIS CREEK AT DRURY'S RANCH, SASK.

LOCATION.—In NE. ¼ sec. 29, T. 6, R. 25 W. third meridian, about a mile above junction of creek with Frenchman River and 5 miles southeast of Belanger post office.

DRAINAGE AREA.—45 square miles.

RECORDS AVAILABLE.—Open-water season; complete records May 24 to November 3, 1909; discharge measurements only 1910; complete records April 23, 1911, to October 31, 1917.

GAGE.—Vertical staff attached to a post sunk in bed of creek securely stayed to right bank; read by J. D. Gilchrist. Stevens continuous water-stage recorder was installed October 14, 1917, for use in collecting flood data.

DISCHARGE MEASUREMENTS.—Made by wading or, at low stages, with weir.

CHANNEL AND CONTROL.—Bed of creek sand and coarse gravel; one channel at ordinary stages; two or more channels at high stages. Control affected by brush in high water.

EXTREMES OF DISCHARGE.—1909–1917: Maximum stage recorded, 5.12 feet, April 10, 1912 (discharge, 529 second-feet); minimum stage recorded, 0.81 foot, water standing in pools, September 25 to October 31, 1917.

ICE.—Observations discontinued during winter.

ACCURACY.—Stage-discharge relation permanent, excepting at high stages and during periods of ice and break-up. Gage read to hundredths daily. Daily discharge obtained by applying daily gage height to rating table. Records fair.

Discharge measurements of Davis Creek at Drury's ranch, Sask., 1908–1917.

Date.	Made by—	Gage height.	Discharge.
1908.		*Feet.*	*Sec.-ft.*
Aug. 21	F. T. Fletcher	.....	0.28
1909.			
June 11	H. R. Carscallen	1.14	5.94
29	....do	1.525	27.9
July 15	....do	1.355	16.8
Aug. 5	....do	1.045	1.81
26	....do	1.00	1.67
Sept. 27	....do	.91	.46
1910.			
Apr. 20	H. R. Carscallen	1.13	9.60
June 1	....do	.84	2.82
20	R. G. Swan	.83	1.94
July 18	....do	1.04	.....
Aug. 8	....do	1.68	*a* .28
29	....do	1.24	*a* .13
Sept. 19	....do	.79	*a* .01
Oct. 17	....do	1.04	*a* .026
1911.			
Apr. 20	G. H. Whyte	1.47	57.16
May 18	....do	.90	12.74
June 15	....do	.58	1.94
July 13	....do	.61	2.03
Aug. 15	....do	.54	1.07
Sept. 20	....do	.78	9.09
1912.			
Apr. 1	M. H. French	.55	.823
Apr. 7	....do	4.23	393.87
23	....do	1.34	41.4
May 21	J. S. Wright	.93	9.55
June 12	....do	.72	2.67
July 11	....do	.68	2.23
Aug. 8	....do	.66	1.61
Sept. 9	....do	.57	.51
Oct. 14	....do	.60	.56
Nov. 12	....do	.75	2.81
1913.			
Apr. 17	J. S. Wright	1.25	48.90
May 19	E. W. W. Hughes	.69	8.80
June 21	....do	.46	2.60
1913.			
Sept. 2	E. W. W. Hughes	0.35	0.41
Oct. 20	....do	.....	0
Nov. 13	....do	.....	0
1914.			
Mar. 16	M. H. French	1.42	58.00
20	....do	.67	.93
Apr. 8	....do	1.38	58.00
22	....do	.68	10.10
May 9	F. R. Steinberger	.93	26.00
27	....do	.42	2.80
June 29	....do	.43	1.53
July 22	....do	.34	1.12
Aug. 12	....do	.24	*a* .57
31	E. W. W. Hughes	.16	*a* .06
Sept. 21	....do	.....	0
Oct. 18	....do	.41	2.30
1915.			
Mar. 30	M. H. French	.61	8.50
Apr. 12	....do	.78	32.00
May 14	J. E. Caughey	.73	26.00
June 17	....do	.35	4.10
July 15	....do	.56	16.90
Aug. 6	....do	.30	2.40
27	....do	.25	2.20
Sept. 28	....do	.19	.64
Oct. 18	....do	.32	3.00
29	....do	.28	1.99
1916.			
Mar. 28	M. H. French	1.10	68.0
Apr. 5	....do	.67	28.0
May 11	J. E. Caughey	.39	8.2
June 9	....do	.48	14.5
11	....do	2.53	187.0
July 11	....do	.25	4.2
27	....do	1.73	131.0
Sept. 2	L. B. P. Miles	.23	2.4
Oct. 21	....do	.42	10.5
1917.			
Apr. 18	H. W. Rowley	3.28	161.00
May 2	....do	3.11	139.00
25	....do	1.60	16.40
July 7	....do	1.12	1.74
24	....do	1.11	*a* 1.01

a Discharge determined by using weir.

Daily discharge, in second-feet, of Davis Creek at Drury's ranch, Sask., 1909–1917.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1909.										
1					8.8	26.1	4.5	1.65	0.4	1.65
2					8.8	19.8	4.5	1.65	.4	1.65
3					8.8	8.8	4.5	1.65	.4	1.65
4					4.5	8.8	4.5	1.65	.4	
5					4.5	19.8	1.65	1.65	.4	
6					4.5	a64.0	1.65	1.65	.4	
7					4.5	a47.8	1.65	1.65	.4	
8					4.5	19.8	1.65	1.65	.4	
9					8.8	14.1	1.65	1.65	.4	
10					4.5	14.1	1.65	1.65	.4	
11					4.5	a32.8	1.65	1.65	.4	
12					4.5	a32.8	1.65	1.65	.4	
13					4.5	a64.0	1.65	1.65	.4	
14					4.5	a32.8	1.65	1.65	.4	
15					4.5	19.8	1.65	1.65	.4	
16					4.5	19.8	1.65	1.65	.4	
17					8.8	14.1	1.65	1.65	.4	
18					14.1	26.1	1.65	1.65	.4	
19					14.1	19.8	1.65	1.65	.4	
20					a310.0	14.1	1.65	1.65	.4	
21					a400.0	14.1	1.65	.4	.4	
22					a80.0	8.8	1.65	.4	.4	
23					a40.1	8.8	1.65	.4	.4	
24				a55.8	a32.8	4.5	1.65	.4	.4	
25				26.1	a32.8	4.5	1.65	.4	.4	
26				19.8	a32.8	4.5	1.65	.4	.4	
27				14.1	a32.8	4.5	1.65	.4	1.65	
28				14.1	a40.1	8.8	1.65	.4	1.65	
29				14.1	a32.8	14.1	1.65	.4	1.65	
30				8.8	29.4	4.5	1.65	.4	1.65	
31				8.8		4.5	1.65		1.65	
1911.										
1				20.0	8.1	9.8		.3	7.1	
2				22.0	5.9	51.0		.4	6.8	
3				25.0	4.6	23.0		.4	6.8	
4				25.0	4.1	11.0		.5	6.8	
5				24.0	4.6			.5	6.8	
6				19.0	8.1			.8	6.4	
7				10.0	9.0			4.9	6.1	
8				9.4	7.0			4.5	6.1	
9				8.1	6.6			3.4	5.8	
10				7.7	6.6			2.8	5.1	
11				8.1	3.8			1.4	4.5	
12				8.5	2.2			1.0	4.0	
13				7.7	1.7	1.2		1.0	3.8	
14				7.7	1.3			1.4	3.5	
15				8.5	1.3		1.1	2.0	3.5	
16				19.0	.9		1.2	2.0	3.2	
17				19.0	.7		1.0	1.9		
18				13.0	1.3		.9	12.9		
19				13.0	1.2		.9	15.0		
20				13.0	1.3		.9	9.1		
21				9.4	1.7		.6	6.1		
22				6.2	1.5		.6	8.4		
23			95	9.4	1.5		.6	8.0		
24			93	12.0	1.5		.6	8.0		
25			92	11.0	1.7		.4	12.0		
26			81	11.0	16.0		.4	12.0		
27			44	13.0	13.0		.4	10.0		
28			19	11.0	7.0		.4	8.0		
29			19	10.0	4.6		.4	8.0		
30			19	9.8	5.9		.4	7.5		
31				9.0			.3			

a Estimated.

Daily discharge, in second-feet, of Davis Creek at Drury's ranch, Sask., 1909–1917—Con.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1912.										
1			0.75	41.4	11.0	1.60	1.50	0.90	0.60	2.50
2			.75	34.2	9.0	1.5	1.5	.8	.6	2.25
3			1.40	28.6	6.95	1.5	1.5	.8	.6	2.25
4			1.90	27.0	5.9	1.5	1.5	.8	.65	2.
5			343.20	24.9	5.2	1.5	1.5	.8	.70	2.
6			353.00	29.4	4.5	1.6	1.5	.8	.7	1.9
7			393.20	43.9	4.0	1.6	1.5	.8	.7	2.5
8			486.00	79.0	3.5	1.5	1.6	.75	.7	3.
9			522.80	60.1	3.0	1.4	1.5	.85	.75	3.
10			529.20	51.1	3.0	1.4	1.5	.85	.75	3.25
11			446.00	27.0	3.0	1.8	1.5	.8	.8	3.25
12			250.80	20.0	3.0	1.6	1.5	.8	.8	3.25
13			93.00	17.2	2.5	1.8	1.5	.8	1.1	3.5
14				15.8	3.5	2.0	1.5	.8	1.0	3.5
15				15.1	27.0	1.9	1.5	.8	1.2	3.75
16				13.7	44.8	1.8	1.4	.75	1.4	3.75
17				13.0	42.2	1.8	1.4	.75	1.5	
18				12.0	8.0	1.7	1.4	.75	1.6	
19				11.0	5.55	1.7	1.5	.75	2.5	
20				10.0	4.25	1.7	1.4	.75	3.0	
21				9.5	3.0	1.7	1.4	.75	3.25	
22				9.0	2.5	1.7	1.4	.70	3.25	
23				10.0	2.0	1.7	1.4	.6	3.0	
24				9.5	1.9	1.7	1.3	.6	2.75	
25				8.5	1.9	1.7	1.3	.6	3.0	
26				8.5	1.9	1.7	1.3	.6	3.5	
27				15.8	1.8	1.7	1.3	.6	4.0	
28				95.0	1.7	1.7	1.2	.6	4.25	
29				43.0	1.7	1.7	1.2	.6	3.75	
30				25.6	1.6	1.6	1.2	.6	3.5	
31				17.9		1.5	.95		3.0	
1913.										
1			2.2	9.6	4.2	2.4	2.20	.50	.10	
2			9.2	11.0	3.4	2.4	2.20	.50	.10	
3			18.2	11.9	3.2	2.4	2.00	.50	.10	
4			40.0	9.6	3.2	2.6	2.20	.44	.10	
5			114.0	9.2	2.8	8.1	2.20	.44	.10	
6			259.0	8.5	2.8	6.4	2.20	.44	.10	
7			172.0	7.8	2.8	3.0	2.20	.32	.10	
8			226.0	9.2	2.6	2.6	2.20	.32	.10	
9			167.0	8.8	2.6	2.6	2.20	.18	.09	
10			193.0	8.5	2.6	2.6	2.20	.16	.09	
11			214.0	8.5	2.6	2.6	2.20	.18	.08	
12			189.0	7.8	2.8	2.6	2.20	.18	.08	
13			205.0	7.4	2.6	3.0	2.00	.16	.07	
14			82.0	11.0	2.6	2.8	2.00	.16	.08	
15			81.0	12.8	2.6	2.8	1.80	.16	.08	
16			64.0	11.0	2.8	2.8	1.60	.14	.07	
17			49.0	9.2	2.6	2.6	1.60	.14	.07	
18			[a] 41.0	9.2	2.6	2.6	1.60	.14	.07	
19			36.0	8.8	2.6	2.6	1.60	.14	.07	
20			[a] 30.0	8.5	2.8	2.6	1.20	.14	.06	
21			[a] 24.0	7.8	2.6	2.6	1.20	.14	.05	
22			19.4	6.4	2.6	2.6	1.20	.14	.05	
23			[a] 14.8	6.4	2.6	2.6	.92	.14	.05	
24			11.0	5.8	2.8	2.4	.92	.14	.05	
25			9.2	5.2	2.8	2.6	.78	.14	.05	
26			8.5	4.7	2.8	2.6	.64	.14	.05	
27			10.1	4.7	2.6	2.4	.64	.14	.04	
28			11.9	4.2	2.4	2.4	.64	.12	.04	
29			11.9	4.7	2.4	2.4	.50	.10	.04	
30			11.4	4.7	2.4	2.4	.50	.10	.04	
31				4.2		2.2	.64		.04	

[a] Interpolated.

Daily discharge, in second-feet, of Davis Creek at Drury's ranch, Sask., 1909–1917—Con.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1914.										
1			21.0	5.00	1.90	2.30				
2			23.0	4.50		a 2.30				
3			32.0	4.20		a 2.20				
4			35.0	4.80	1.80	2.00				
5			a 96.0	4.80	1.80	1.90				
6			154.0	5.00		1.90				
7			128.0	a 9.00	1.80	1.90				
8			121.0	14.60		2.00				
9			48.0	25.00		1.90				
10		5.0	48.0	24.00		1.90				
11		5.3	37.0	20.00	1.70	1.80				
12		5.3	72.0	a 15.80		1.80				
13		6.0	98.0	12.50		1.80				
14		150.0	80.0	10.00		a 1.90				
18		84.0	58.0	8.20		1.90				
16		70.0	66.0	a 7.40		2.40				
17		42.0	36.0	6.60		2.40				
18		17.2	26.0	a 5.40		a 2.40				
19		20.0	13.5	4.50		2.40				
20		4.2	13.0	a 4.00		2.40				
21		1.9	14.0	3.80		2.40				
22		4.2	11.5	a 3.60		1.40	0.25			
23		13.2	13.5	a 3.40		1.50	.25			
24		9.4	12.5	a 3.00		1.40	.32			
25		17.6	9.5	a 2.80		1.30	.25			
26		6.4	9.0	2.60		1.40	.20			
27		6.2	a 8.2	2.30		1.50	.20			
28		5.0	7.4	2.30		1.30	.15			
29		5.2	7.4	2.00	2.40	1.20	.15			
30		6.2	6.6	a 2.00	2.40	a 1.20	.15			
31		6.4		1.90		a 1.20	.05			
1915.										
1			27.0	3.10	8.8	8.8	5.40	1.38	0.65	
2			184.0	2.80	46.0	8.8	4.20	1.38	.65	
3			384.0	2.40	59.0	8.8	3.10	1.38	.65	
4			316.0	2.20	65.0	8.2	2.40	1.38	.87	
5			212.0	2.10	49.0	8.2	2.40	1.38	1.21	
6			106.0	1.89	34.0	7.7	2.40	1.38	1.55	
7			73.0	1.89	22.0	6.1	2.40	1.38	2.20	
8			58.0	1.72	14.6	25.0	2.40	1.38	2.80	
9			50.0	1.72	11.4	51.0	2.40	1.38	3.90	
10			34.0	1.72	9.8	47.0	2.40	1.38	5.00	
11			29.0	1.72	8.8	38.0	2.40	1.38	5.70	
12			35.0	1.72	8.8	30.0	2.40	1.38	5.40	
13			33.0	1.72	7.7	22.0	2.20	1.38	5.00	
14			30.0	1.89	6.1	17.9	2.20	1.38	4.60	
15			25.0	11.40	5.7	15.3	2.20	1.38	3.90	
16			16.6	28.00	5.0	14.6	2.40	1.38	3.50	
17			15.3	25.00	4.2	13.4	2.40	1.38	3.10	
18			13.4	23.00	5.0	12.7	2.40	1.38	3.10	
19			13.4	17.90	7.2	11.4	2.40	1.38	3.10	
20			a 12.0	14.60	26.0	10.9	2.20	1.38	2.80	
21			10.9	11.40	23.0	6.6	4.20	1.38	2.80	
22			10.3	6.10	17.9	6.1	4.20	1.38	2.80	
23		2.40	9.8	2.40	11.4	7.7	3.50	1.21	2.40	
24		1.72.	a 9.3	1.89	6.1	6.6	2.40	1.04	2.40	
25		1.72	a 8.2	1.55	2.8	6.1	2.10	.87	2.20	
26		1.55	7.7	1.72	6.1	6.1	1.55	.87	2.20	
27		7.70	5.7	1.55	7.2	6.1	1.55	.70	2.20	
28		12.00	4.2	8.80	8.8	6.1	1.55	.65	2.10	
29		17.20	3.5	9.30	8.8	14.6	1.38	.65	2.10	
30		18.60	3.5	8.80	8.2	8.8	1.38	.65	2.10	
31		18.60		8.80		7.2	1.38		2.10	

a Interpolated.

Daily discharge, in second-feet, of Davis Creek at Drury's ranch, Sask., 1909–1917—Con.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1916.										
1	.....	173.0	36.0	15.4	46.0	31.00	137.0	2.6	9.1	.....
2	.....	168.0	27.0	15.4	40.0	26.00	59.0	2.6	11.8	.....
3	.....	59.0	23.0	13.6	32.0	21.00	52.0	2.8	11.8	.....
4	.....	53.0	21.0	13.6	25.0	52.00	34.0	2.8	10.7	.....
5	.....	43.0	21.0	13.0	122.0	43.00	16.8	2.8	9.1	.....
6	.....	39.0	21.0	13.0	108.0	34.00	9.6	4.7	11.8	.....
7	.....	35.0	19.6	11.0	45.0	23.00	8.6	6.3	18.1	.....
8	.....	30.0	19.6	11.3	30.0	14.20	7.7	4.7	30.0	.....
9	.....	14.8	36.0	10.7	14.2	7.20	8.6	5.0	26.0	.....
10	.....	13.6	48.0	10.7	23.0	5.00	8.6	4.7	24.0	.....
11	.....	14.8	34.0	9.1	164.0	4.40	8.6	4.7	23.0	.....
12	.....	15.4	28.0	9.1	95.0	2.60	7.7	4.4	18.1	.....
13	.....	[a] 184.0	31.0	10.2	96.0	2.00	6.8	4.4	16.8	.....
14	.....	353.0	27.0	9.6	29.0	2.00	6.3	3.7	14.8	.....
15	.....	228.0	33.0	9.6	9.1	2.00	5.4	3.1	13.0	.....
16	.....	103.0	33.0	9.6	9.6	1.76	4.7	3.1	11.8	.....
17	.....	25.0	36.0	9.6	7.7	2.00	4.0	3.1	11.8	.....
18	209	30.0	52.0	9.1	7.7	3.40	3.4	3.1	11.8	.....
19	209	25.0	31.0	8.2	7.7	4.00	3.4	3.1	11.8	.....
20	212	58.0	26.0	7.4	7.7	.....	3.4	3.1	11.8	.....
21	207	255.0	21.0	7.2	5.4	.....	3.1	3.1	10.7	.....
22	206	393.0	18.8	7.2	27.0	.....	3.1	2.8	10.7	.....
23	203	171.0	19.6	9.1	108.0	.....	3.1	2.8	10.7	.....
24	201	95.0	18.8	12.4	86.0	.....	2.8	2.8	10.7	.....
25	197	113.0	18.1	64.0	73.0	.....	2.8	3.1	10.2	.....
26	193	88.0	16.8	64.0	56.0	.....	2.8	10.7	10.2	.....
27	187	115.0	16.8	153.0	52.0	.....	2.8	11.8	10.2	.....
28	183	91.0	16.8	168.0	46.0	.....	2.6	11.8	9.1	.....
29	178	45.0	16.8	148.0	33.0	.....	2.6	10.7	9.1	.....
30	.....	47.0	15.4	134.0	35.0	.....	2.6	10.2	9.1	.....
31	.....	36.0	.....	52.0	.....	.....	2.6	.....	8.6	.....

Day.	June.	July.	Aug.	Sept.	Day.	June.	July.	Aug.	Sept.
1917.					1917.				
1	2.8	2.30	1.9	12.1	16	9.5	.....	5.2	9.5
2	2.3	2.30	2.0	12.1	17	9.5	.....	6.3	9.2
3	2.0	2.00	2.3	12.1	18	9.5	.....	6.3	8.9
4	2.0	2.00	2.4	11.7	19	9.2	0.02	7.3	8.2
5	16.4	1.78	2.6	11.4	20	8.9	.04	7.9	7.6
6	14.6	1.78	2.7	11.1	21	8.9	.06	8.2	6.3
7	13.8	1.52	2.8	11.1	22	8.9	.08	9.5	5.8
8	13.4	1.52	2.9	11.1	23	6 3	1.00	11.1	8.2
9	13.4	1.00	3.0	10.8	24	6.0	1.01	12.1	7.6
10	12.7	1.26	3.1	10.5	25	4.7	1.14	13.4	.....
11	12.7	.08	3.6	10.1	26	3.6	1.27	13.4	.....
12	13.4	.....	4.1	10.1	27	3.1	1.30	13.1	.....
13	12.1	.....	4.4	10.1	28	2.3	1.43	12.7	.....
14	10.1	.....	4.7	9.8	29	2.3	1.56	12.7	.....
15	9.5	.....	5.0	9.5	30	2.3	1.69	12.4	.....
					31	.....	1.72	12.4	.....

[a] Estimated.

NOTE.—1911: No observer before Apr. 23 and between July 4 and Aug. 15.
1912: No observer Apr. 14–30.
1913: Apr. 1–3, ice in creek; discharge estimated.
1914: Stage-discharge relation affected by ice Mar. 10 to Apr. 8.
1916: July 20–31, determinations not published because observer's records were unreliable. June 11–22, shifting control.
1917: Observer unobtainable prior to June 1. July 12–18, no flow; water standing in pools. July 19–23 and July 25 to Aug. 9, discharge estimated. Sept. 25 to Oct. 31, no flow; water standing in pools.

Monthly discharge of Davis Creek at Drury's ranch, Sask., 1909–1917.

[Drainage area, 45 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1909.						
May 24–31	55.8	8.8	20.2	0.481	0.143	321
June	400.0	4.5	39.7	.945	1.054	2,362
July	64	4.5	19.4	.461	.531	1,192
August	4.5	1.65	2.02	.048	.055	124
September	1.65	.4	1.23	.029	.032	73
October	1.65	.4	.60	.014	.016	37
November 1–3	1.65	1.65	1.65	.039	.004	10
The period					1.835	4,119
1911.						
April 23–30	95.0	19.0	57.80	1.280	.381	917
May	25.0	6.2	12.90	.287	.331	793
June	16.0	.7	4.49	.100	.112	267
July 1–4 and 13	51.0	1.2	19.20	.427	.079	190
August 15–31	1.2	.3	.70	.015	.009	24
September	15.0	.3	5.14	.114	.127	306
October 1–16	7.1	3.2	5.36	.119	.071	171
The period					1.110	2,668
1912.						
April 1–13	529.20	.75	142.6	3.17	3.54	8,485
May	79.00	8.50	26.66	.59	.68	1,639
June	44.80	1.60	6.99	.15	.17	417
July	2.00	1.40	1.66	.04	.05	102
August	1.60	.95	1.41	.03	.04	87
September	.90	.60	.74	.02	.02	44
October	4.25	.60	1.90	.04	.05	117
November 1–16	3.75	1.90	2.85	.06	.04	91
The period					4.59	10,982
1913.						
April	259.00	2.20	77.400	1.720	1.920	4,609
May	12.80	4.20	7.970	.177	.204	490
June	4.20	2.40	2.760	.061	.068	164
July	8.10	2.20	2.870	.064	.074	176
August	2.20	.50	1.550	.034	.039	95
September	.50	.10	.221	.005	.006	13
October	.10	.04	.071	.002	.002	4
The period					2.313	5,551
1914.						
March 10–31	150.00	1.90	22.00	.500	.410	973
April	154.00	6.60	44.00	.970	1.080	2,588
May	25.00	1.90	7.20	.160	.180	446
July	2.40	1.20	1.85	.041	.047	114
August 22–31	.25	.05	.20	.004	.001	4
The period					1.729	4,152
1915.						
March 23–31	18.60	1.55	9.00	.200	.07	161
April	38.40	3.50	58.00	1.290	1.44	3,451
May	2.80	1.55	6.80	.151	.17	418
June	6.50	2.80	16.80	.373	.42	1,000
July	5.10	6.10	14.50	.322	.37	892
August	5.40	1.38	2.50	.056	.06	154
September	1.38	.65	1.23	.027	.03	73
October	5.70	.65	2.70	.060	.07	166
The period					2.63	6,315
1916.						
February 18–29	212.0	178.00	199.0	4.420	.197	4,735
March	393.0	13.60	100.0	2.220	2.560	6,149
April	52.0	15.40	26.0	.578	.645	1,547
May	168.0	7.20	34.0	.756	.872	2,090
June	164.0	5.40	48.0	1.070	1.190	2,856
July 1–19	52.0	1.76	14.8	.328	.232	558
August	137.0	2.60	13.7	.304	.350	842
September	11.8	2.60	4.8	.107	.119	286
October	30.0	8.60	13.2	.294	.339	812
The period					6.504	19,875

Monthly discharge of Davis Creek at Drury's ranch, Sask., 1909–1917—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet
1917.						
June	16.4	2.00	8.20	0.182	0.20	488
July	2.3	0	.96	.021	.02	59
August	13.4	1.90	6.50	.144	.17	400
September	12.1	0	7.80	.173	.19	464
The period					.58	1,411

Mean monthly discharge, in second-feet, of Davis Creek at Drury's ranch, Sask., 1909–1917.

Year.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total in acre-feet.
1909	.....	.....	.....	a20.0	b40.00	19.40	2.00	1.23	0.60	a1.65	a4,119
1911	.....	.....	a58	12.9	4.50	a19.20	a.70	5.10	a5.40	.....	a2,668
1912	.....	.....	a143	27.0	7.00	1.66	1.41	.74	1.90	a2.80	10,982
1913	.....	.....	77	8.0	2.80	2.90	1.55	.22	.07	.....	5,551
1914	.....	c16.0	44	7.2	d1.97	1.85	a.20	.....	.....	.....	a4,242
1915	.....	a9.0	58	6.8	16.80	14.50	2.50	1.23	2.70	.....	6,313
1916	a199.0	100.0	26	34.0	48.00	a14.80	13.70	4.80	13.20	.....	19,875
1917	.....	.....	.....	.....	8.20	.96	6.50	7.80	0	.....	a1,411
Average	.....	b20	51	16.0	16.2	6.9	4.6	3.0	3.1	.....	10,681
Average run-off, acre-feet	.....	1,230	3,035	984	964	424	283	179	191	.....	7,290
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	162

a Incomplete record not included in average.
b Estimated.
c Reduced to monthly average.
d Average for part of month assumed as monthly average.

NOTE.—No records during 1910 except discharge measurements.

FAIRWELL CREEK AT DRURY'S RANCH, SASK.

LOCATION.—In NW. ¼ sec. 30, T. 6, R. 24 W. third meridian, about 11 miles southeast of Belanger post office.

DRAINAGE AREA.—125 square miles.

RECORDS AVAILABLE.—June 10, 1909, to July 31, 1917.

Discharge measurement only November 8, 1917.

GAGE.—Vertical staff; read by C. A. Drury.

DISCHARGE MEASUREMENTS.—Made by wading near gage.

CHANNEL AND CONTROL.—Bed of stream composed of sand and coarse gravel. Banks comparatively low and subject to overflow at high stages. One channel at ordinary stages. Two or more channels at high stages. Control not permanent.

EXTREMES OF STAGE.—1909–1917: Maximum stage recorded, 4.80 feet April 21, 1917 (discharge, 1,466 second-feet); minimum stage recorded 2 feet April 1 to 4, 1913 (discharge, 0.05 second-foot).

ICE.—Station not maintained during winter.

DIVERSIONS.—There are several authorized irrigation projects on this stream that divert water for irrigation above this station.

ACCURACY.—Stage-discharge relation likely to change during high water. Gage read twice daily during high stages and once daily during low stages. Daily discharge obtained by applying mean daily gage height to rating table. Records fair.

Discharge measurements of Fairwell Creek at Drury's ranch, Sask., 1908–1917.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
1908.			
Aug. 6	F. T. Fletcher		2.15
1909.			
May 21	H. R. Carscallen		51.1
June 10	do	1.94	11.6
28	do	2.75	81.8
July 15	do	2.555	50.7
Aug. 25	do	2.00	6.4
Sept. 25	do	1.92	4.1
1910.			
Apr. 19	H. R. Carscallen	2.14	20.78
May 13	do	1.99	10.63
June 1	do	2.00	9.35
18	R. G. Swan		6.35
July 16	do	1.865	2.84
Aug. 8	do	1.850	2.71
29	do	1.820	1.31
Sept. 19	do	1.780	.67
Oct. 17	do	1.750	.68
1911.			
Apr. 19	G. H. Whyte	3.055	197.14
May 17	do	2.300	42.01
June 14	do	1.980	10.83
July 12	do	1.960	8.66
Aug. 12	do	1.87	3.83
Sept. 25	do	1.750	2.55
Oct. 19	do	1.920	8.31
1912.			
May 21	J. S. Wright	3.00	12.13
June 12	do	2.85	10.64
July 11	do	2.61	6.13
Aug. 7	do	2.54	3.46
Sept. 9	do	2.70	[a] 1.51
Oct. 14	do	2.57	3.57
Nov. 12	do	2.73	6.61
1913.			
Apr. 17	J. S. Wright	3.36	102.00
May 19	E. W. W. Hughes	2.78	17.60
June 19	do	2.47	6.78
July 19	do	2.48	5.80
28	do	2.47	4.83
Aug. 30	do	2.40	2.44
Sept. 27	do	2.37	1.22
Oct. 18	do	2.33	.64
Nov. 12	do	2.32	.67
1914.			
Mar. 16	M. H. French	3.68	223.00
20	do	2.65	16.10
Apr. 7	do	3.61	192.00
9	do	3.12	80.00
22	do	2.72	26.00
May 8	F. R. Steinberger	2.73	24.00
26	do	2.48	9.40
June 27	do	2.41	4.30
July 21	do	2.34	2.60
Aug. 11	do	2.30	1.94
29	E. W. W. Hughes	2.34	.98
Sept. 21	do	2.28	[b] .50
1915.			
Mar. 30	M. H. French	2.49	1.37
Apr. 10	do	3.07	70.00
13	do	2.91	50.00
21	do	2.56	17.80
May 16	J. E. Caughey	2.60	28.00
June 17	do	2.49	12.20
July 15	do	2.43	12.60
Aug. 5	do	2.43	10.60
27	do	2.26	5.10
Sept. 27	do	2.18	3.30
Oct. 15	do	2.18	2.80
29	do	2.26	4.60
1916.			
Mar. 27	M. H. French	3.73	323.0
Apr. 5	do	2.68	33.0
May 11	J. E. Caughey	2.39	22.0
June 9	do	2.52	30.0
13	do	2.85	89.0
July 11	do	2.30	14.9
26	do	2.33	13.0
Sept. 1	L. P. Miles	2.15	7.1
Oct. 13	do	2.48	[a] 25.0
1917.			
Apr. 19	H. W. Rowley	3.50	259.0
May 2	do	4.15	388.0
28	do	2.90	27.0
July 6	do	2.50	6.5
Nov. 8	do	2.35	2.2

[a] Gage height affected by beaver dams. [b] Weir measurement.

Daily discharge, in second-feet, of Fairwell Creek at Drury's ranch, Sask., 1909–1917.

Day.	June.	July.	Aug.	Sept.	Oct.	Day.	June.	July.	Aug.	Sept.	Oct.
1909.						1909.					
1		25.95	11.1	4.9	3.8	16	11.6	43.2	7.7	4.7	3.25
2		26.8	10.6	4.9	3.8	17	11.05	16.15	7.7	4.7	3.25
3		26.8	10.1	5.2	3.6	18	11.05	18.8	7.7	4.45	3.25
4		26.8	8.85	4.9	3.6	19	11.6	17.5	7.05	4.45	3.25
5		26.8	8.4	4.9	3.6	20	[a] 471.0	13.2	7.05	4.45	3.25
6		[a] 116.0	8	4.9	3.6	21	[a] 443.0	12.1	6.7	4.45	3.25
7		57.2	7.7	4.9	3.6	22	[a] 285.0	11.6	6.7	4.45	3.25
8		43.2	7.35	4.9	3.6	23	81.8	10.1	6.4	4.45	3.25
9		43.2	7.05	4.9	3.6	24	[a] 94.4	8.85	6.4	4.25	3.45
10	11.6	43.2	7.05	4.9	3.45	25	81.8	7.70	6.4	4.25	3.45
11	11.05	[a] 364.0	7.35	4.9	3.45	26	44.55	8.00	6.1	4	3.45
12	10.55	[a] 128.0	7.35	4.7	3.45	27	43.2	8.85	6.1	4	3.45
13	9.60	81.8	7.35	4.7	3.45	28	81.8	11.6	5.8	4	3.45
14	11.6	64.9	7.7	4.7	3.45	29	50	23.35	5.2	3.8	3.45
15	11.6	50	7.7	4.7	3.45	30	31.7	14.9	4.9	3.8	3.45
						31		12.1	4.9		3.45

[a] Estimated.

Daily discharge, in second-feet, of Fairwell Creek at Drury's ranch, Sask., 1909–1917— Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1910.									
1	.....	.....	17.0	4.1	4.1	1.3	1.3	0.9	.....
2	.....	.....	17.0	4.1	4.1	1.3	1.3	1.1	.....
3	.....	.....	17.0	4.1	4.1	1.3	1.3	1.1	.....
4	.....	.....	17.0	4.1	4.1	1.3	4.1	1.1	.....
5	.....	.....	17.0	4.1	4.1	9.2	4.1	1.1	.....
6	.....	.....	17.0	4.1	4.1	4.1	4.1	1.1	.....
7	.....	.....	17.0	4.1	4.1	4.1	4.1	1.2	.....
8	.....	.....	17.0	4.1	4.1	4.1	4.1	1.2	.....
9	.....	.....	17.0	4.1	4.1	4.1	1.3	1.1	.....
10	.....	.....	17.0	4.1	4.1	4.1	1.3	1.1	.....
11	.....	.....	17.0	4.1	4.1	4.1	1.3	1.1	.....
12	.....	.....	17.0	4.1	4.1	4.1	1.3	1.1	.....
13	.....	.....	9.2	4.1	4.1	4.1	1.3	.9	.....
14	.....	.....	9.2	4.1	4.1	4.1	1.3	.9	.....
15	.....	.....	9.2	4.1	4.1	4.1	.3	.9	.....
16	.....	.....	9.2	4.1	4.1	4.1	.3	.8	.....
17	.....	.....	9.2	4.1	1.3	4.1	.3	.8	.....
18	.....	.....	17.0	4.1	1.3	1.3	1.3	.8	.....
19	.....	22.0	17.0	9.2	1.3	1.3	1.3	.8	.....
20	.....	22.0	17.0	9.2	1.3	1.3	1.2	.8	.....
21	.....	22.0	17.0	9.2	1.3	1.3	1.2	.8	.....
22	.....	17.0	9.2	9.2	1.3	1.3	1.2	.8	.....
23	.....	17.0	9.2	9.2	1.3	1.3	1.2	.9	.....
24	.....	17.0	9.2	4.1	1.3	1.3	1.2	.9	.....
25	.....	17.0	9.2	4.1	1.3	1.3	1.1	.9	.....
26	.....	17.0	9.2	4.1	1.3	1.3	1.1	.9	.....
27	.....	17.0	9.2	4.1	1.3	1.3	1.1	.9	.....
28	.....	17.0	9.2	4.1	1.3	1.3	.9	.9	.....
29	.....	17.0	9.2	4.1	1.3	1.3	.9	.9	.....
30	.....	17.0	9.2	4.1	1.3	1.3	.9	.9	.....
31	.....	.....	4.1	.....	1.3	1.3	.....	.9	.....
1911.									
1	.....	42.0	30	11.0	11.0	4.4	2.7	2.5	.....
2	.....	27.0	22	11.0	11.0	4.1	2.9	2.7	.....
3	.....	34.0	22	11.0	11.0	4.4	3.1	3.1	.....
4	.....	20.0	21	11.0	11.0	4.4	3.3	8.6	.....
5	.....	25.0	24	11.0	11.0	4.7	3.5	9.0	.....
6	.....	19.0	21	11.0	11.0	5.0	4.4	9.6	.....
7	.....	9.6	20	11.0	11.0	5.0	4.1	9.6	.....
8	.....	12.0	20	11.0	11.0	5.0	2.9	9.6	.....
9	.....	140.0	17	11.0	11.0	4.7	2.9	9.6	.....
10	.....	512.0	17	11.0	10.0	4.7	2.5	9.6	.....
11	.....	409.0	.....	11.0	9.6	4.4	2.3	9.6	.....
12	.....	135.0	.....	11.0	9.6	4.1	2.5	9.6	.....
13	.....	115.0	.....	11.0	9.0	3.8	2.5	8.6	.....
14	.....	115.0	.....	11.0	9.0	3.8	2.7	8.1	.....
15	.....	113.0	.....	11.0	8.6	3.5	2.7	8.6	.....
16	.....	423.0	.....	11.0	8.6	3.8	2.9	8.6	.....
17	.....	332.0	42	11.0	8.6	3.8	3.1	9.0	.....
18	.....	205.0	34	11.0	8.1	3.3	3.3	9.0	.....
19	.....	183.0	.....	11.0	8.1	3.3	3.5	8.6	.....
20	2.9	207.0	.....	11.0	7.7	3.3	3.5	8.6	.....
21	3.5	176.0	.....	11.0	7.7	3.1	3.3	8.6	.....
22	9.0	159.0	.....	10.0	7.2	3.1	3.1	8.6	.....
23	92.0	109.0	.....	10.0	6.8	2.9	2.9	8.6	.....
24	447.0	73.0	.....	10.0	6.4	2.9	2.7	9.0	.....
25	399.0	73.0	.....	11.0	6.1	3.1	2.5	10.0	.....
26	257.0	56.0	.....	11.0	5.7	3.1	2.3	9.6	.....
27	231.0	58.0	.....	11.0	5.7	2.9	2.5	10.0	.....
28	147.0	37.0	.....	11.0	5.4	2.9	2.5	10.0	.....
29	173.0	30.0	.....	11.0	5.0	2.7	2.5	.....	.....
30	113.0	30.0	.....	11.0	4.7	2.5	2.5	.....	.....
31	117.0	.....	.....	.....	4.7	2.5	.....	.....	.....

Daily discharge, in second-feet, of Fairwell Creek at Drury's ranch, Sask., 1909–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1912.									
1			22.25			4.25	3.68	3.54	4.40
2			21.30			4.30	4.40	3.40	4.72
3			19.40			4.25	4.26	3.40	5.38
4			18.64			4.20	4.56	3.54	6.10
5			18.26			4.05	4.26	3.54	6.10
6			18.64			3.80	3.97	3.68	6.10
7			19.40			3.54	3.82	3.82	6.46
8			23.20			3.54	3.27	a3.82	6.46
9		786	22.63			3.40	6.10	a3.82	6.46
10		814	20.16			3.54	4.11	a3.82	6.46
11		704	17.5		6.15	3.54	4.11	a3.97	6.64
12		578	17.5		5.90	3.54	4.40	a3.97	6.64
13		412	17.5		5.80	3.54	4.40	a3.97	6.81
14		352	17.12		5.70	3.40	4.56	3.97	7.00
15		284	16.74		5.65	3.27	4.56	3.97	5.56
16		364	15.98		5.65	3.40	4.26	3.97	
17		334	14.84		5.55	4.40	4.11	4.11	
18		332	14.08		5.50	5.04	4.40	3.97	
19		280	13.70		5.40	5.20	4.72	3.28	
20		238	13.13		5.40	5.04	4.72	3.97	
21		212	12.75		5.40	5.20	4.40	3.97	
22		174	12.18		5.30	7.90	4.40	4.11	
23		152	12.18		5.20	7.90	4.40	4.11	
24		138	13.32		5.05	7.90	4.26	4.11	
25		124			5.05	8.85	4.11	3.97	
26		115			5.00	9.23	3.97	3.97	
27		80			4.90	a7.71	3.97	3.97	
28		56			4.75	a6.29	3.68	3.97	
29		36			4.55	5.04	3.68	3.97	
30		24			4.50	3.40	3.68	4.11	
31					4.35	3.68		4.26	
1913.									
1		.05	18.80	9.80	4.2	4.2	4.20	1.50	
2		.05	17.80	9.40	4.2	3.8	4.60	1.25	
3		.05	17.80	9.00	4.2	3.4	4.20	1.25	
4		.05	16.90	8.60	10.2	3.8	3.80	1.00	
5		15.20	16.00	8.20	7.4	3.8	4.20	1.00	
6		352.00	15.20	8.20	4.6	3.4	4.20	1.00	
7		354.00	15.60	8.20	4.2	3.8	4.20	1.00	
8		354.00	16.00	7.80	5.0	4.6	4.60	1.00	
9		354.00	16.00	7.40	5.0	4.2	4.20	1.25	
10		345.00	16.00	7.40	6.6	4.2	4.60	1.25	
11		300.00	16.00	7.40	7.0	4.2	4.60	1.25	
12		b294.00	16.40	8.20	6.6	4.2	4.20	1.25	
13		287.00	b16.00	8.20	7.4	4.6	4.20	1.25	
14		319.00	16.00	7.40	7.4	4.6	4.60	b1.25	
15		246.00	15.60	6.60	6.6	4.2	4.60	1.25	
16		196.00	16.00	6.60	6.6	4.2	3.00	1.25	
17		98.00	b16.40	7.00	6.2	4.2	1.50	1.00	
18		84.00	16.40	7.40	6.2	4.2	1.50	b.90	
19		71.00	17.80	5.80	5.8	3.8	1.50	.90	
20		61.00	12.30	9.40	5.0	3.8	b1.25	.90	
21		52.00	12.30	6.60	5.0	3.8	1.25	.90	
22		43.00	11.90	5.80	6.2	3.8	1.25	.90	
23		27.00	11.50	5.00	6.2	3.4	1.25	.90	
24		27.00	11.50	5.40	6.2	3.4	1.25	.90	
25		22.00	11.10	6.60	4.6	3.4	1.50	.90	
26		17.80	11.10	7.00	6.2	3.4	b1.50	.90	
28		13.50	11.10	6.60	4.6	3.4	1.50	.90	
27		11.10	11.10	5.80	4.6	3.4	1.50	.90	
29		26.00	10.70	5.80	4.6	3.0	1.50	.90	
30		31.00	10.70	4.60	3.8	3.4	b1.50	.90	
31			9.30		4.2	3.4		.90	

a Discharge interpolated owing to beaver dams.

b Interpolated.

Daily discharge, in second-feet, of Fairwell Creek at Drury's ranch, Sask., 1909–1917.—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1914.									
1	.....	50.0	14.3	a6.5	4.00	1.60	1.60	1.00	.....
2	.....	107.0	14.3	a6.5	4.00	1.40	1.20	.90	.....
3	.....	172.0	14.3	a7.0	4.00	1.40	1.00	1.80	.....
4	.....	198.0	14.3	a7.0	4.00	1.00	1.00	1.40	.....
5	.....	287.0	16.4	a7.0	4.00	1.00	1.00	2.40	.....
6	.....	303.0	16.4	a7.5	4.00	1.00	1.00	1.80	.....
7	.....	238.0	17.8	7.5	4.00	1.00	1.00	1.00	.....
8	0.7	146.0	24.0	a7.5	3.20	1.00	1.00	1.00	.....
9	.6	78.0	27.0	7.5	3.20	1.00	1.00	1.00	.....
10	.8	69.0	29.0	8.5	3.20	1.00	1.00	1.00	.....
11	.8	109.0	27.0	7.0	3.20	1.00	.90	1.00	.....
12	.8	308.0	19.3	6.5	2.40	.90	1.00	1.00	.....
13	.9	265.0	17.8	6.0	2.40	.90	4.00	1.00	.....
14	14.3	156.0	15.0	6.5	2.40	.90	2.40	1.00	.....
15	208.0	116.0	15.0	7.5	2.40	.90	1.80	1.00	.....
16	219.0	96.0	13.6	6.5	2.00	1.00	1.80	1.00	.....
17	114.0	67.0	12.9	6.5	2.00	1.00	1.40	1.00	.....
18	51.0	44.0	12.9	6.5	2.00	1.00	1.40	.80	.....
19	33.0	31.0	12.9	6.5	2.00	1.00	1.00	1.00	.....
20	22.0	34.0	11.5	6.5	2.00	1.00	.80	1.00	.....
21	14.3	29.0	11.5	7.5	1.80	1.00	.80	1.00	.....
22	9.7	23.0	10.9	7.5	1.80	1.00	.70	1.00	.....
23	11.5	23.0	10.9	7.0	1.80	1.00	.70	1.00	.....
24	9.7	22.0	11.5	7.0	1.80	1.40	.70	1.00	.....
25	1.4	21.0	11.5	6.5	1.80	1.80	.70	1.00	.....
26	7.0	17.1	7.5	6.0	1.80	1.80	.70	.90	.....
27	15.7	16.4	6.5	4.8	1.80	1.60	1.00	.90	.....
28	18.5	14.3	6.5	4.8	1.60	1.60	2.40	.90	.....
29	22.0	15.0	6.0	4.8	1.80	1.80	.80	.90	.....
30	22.5	14.3	a6.0	4.8	1.60	1.80	.90	.90	.....
31	22.5	.....	a6.0	.....	1.60	1.80	.....	.90	.....
1915.									
1	.....	10.0	10.0	27.0	14.0	17.4	4.9	3.3	.....
2	.....	126.0	9.5	74.0	13.6	16.8	4.9	3.3	.....
3	.....	294.0	9.1	91.0	13.1	15.1	4.9	3.8	.....
4	.....	250.0	8.8	84.0	11.8	13.1	4.9	4.9	.....
5	.....	208.0	8.5	62.0	11.8	10.9	4.9	4.9	.....
6	.....	156.0	8.8	38.0	11.8	10.9	4.6	4.4	.....
7	.....	138.0	8.8	29.0	11.8	10.9	4.6	4.4	.....
8	.....	97.0	8.8	23.0	12.6	10.9	4.6	3.3	.....
9	.....	96.0	8.5	16.2	15.1	10.0	4.6	3.1	.....
10	.....	a71.0	8.5	13.6	14.0	9.1	4.9	3.1	.....
11	.....	57.0	8.5	14.0	11.8	8.8	4.9	3.1	.....
12	.....	53.0	7.8	13.6	11.8	8.8	4.9	3.1	.....
13	.....	49.0	7.8	13.1	11.8	8.8	4.9	3.1	.....
14	.....	53.0	7.8	13.6	11.8	8.5	4.9	2.9	.....
15	.....	42.0	7.4	13.1	10.9	8.5	4.9	2.7	.....
16	.....	36.0	22.0	14.0	10.9	8.1	4.9	2.7	.....
17	.....	32.9	25.0	14.0	16.8	7.8	4.9	2.7	.....
18	.....	28.0	19.6	13.6	31.0	7.8	4.9	2.7	.....
19	.....	22.0	16.2	23.0	29.0	7.8	4.9	2.9	.....
20	.....	19.0	13.1	61.0	23.0	7.4	4.9	2.9	.....
21	.....	16.8	10.8	58.0	23.0	7.0	4.9	2.9	.....
22	.....	14.6	9.5	46.0	19.6	7.0	4.6	3.1	.....
23	.....	14.0	8.8	31.0	19.6	7.0	4.6	3.3	.....
24	a1.37	13.1	8.5	21.0	16.8	7.0	4.4	3.3	.....
25	a1.35	12.6	12.6	19.6	14.0	7.0	4.1	3.6	.....
26	a1.34	13.1	40.0	16.2	13.1	6.7	3.6	3.6	.....
27	a1.34	10.8	38.0	23.0	14.0	6.0	3.1	3.6	.....
28	a1.35	10.8	22.0	23.0	16.8	5.5	3.1	3.6	.....
29	a1.37	10.8	30.0	19.6	19.6	4.9	3.1	3.6	.....
30	1.37	10.8	26.0	16.8	19.6	4.9	3.1	3.6	.....
31	2.70	.....	26.0	.....	18.5	4.9	.....	3.6	.....

a Interpolated.

Daily discharge, in second-feet, of Fairwell Creek at Drury's ranch, Sask., 1909–1917—Continued.

Day.	Apr.	May	June.	July.	Aug.	Sept.	Oct.	Nov.
1916.								
1	.....	195	33.0	61.0	47.0	19.8	7.2	4.0
2	.....	168	31.0	47.0	39.0	17.4	7.2	5.2
3	.....	142	33.0	44.0	55.0	15.6	7.2	5.4
4	.....	115	33.0	38.0	47.0	13.3	8.3	7.4
5	.....	102	33.0	38.0	25.0	12.4	7.2	7.6
6	.....	89	31.0	128.0	19.8	11.4	7.2	9.5
7	.....	89	30.0	65.0	17.4	10.4	7.2	17.4
8	.....	89	28.0	39.0	16.8	10.0	6.8	21.0
9	.....	115	24.0	28.0	16.2	16.8	6.8	21.0
10	.....	142	19.8	33.0	17.4	33.0	6.8	23.0
11	.....	182	19.8	115.0	16.2	24.0	6.5	24.0
12	.....	155	19.8	128.0	13.8	16.8	6.5	24.0
13	.....	128	16.8	76.0	12.4	13.8	6.1	26.0
14	.....	128	16.8	47.0	11.9	11.4	6.1	26.0
15	.....	128	16.8	34.0	11.4	10.4	5.4	23.0
16	.....	115	19.8	26.0	11.9	10.4	5.4	23.0
17	.....	76	18.6	23.0	10.9	10.0	5.4	22.0
18	.....	102	21.0	19.8	11.4	10.0	5.4	21.0
19	.....	102	19.8	18.6	11.4	10.0	5.1	18.0
20	.....	89	16.8	16.8	10.9	10.0	5.1	16.8
21	.....	76	16.8	15.6	10.0	9.5	4.8	16.8
22	.....	65	16.2	24.0	9.0	9.5	4.6	16.8
23	.....	55	16.2	115.0	8.6	9.5	4.0	16.8
24	.....	53	18.6	76.0	8.3	9.5	4.0	16.8
25	.....	50	76.0	47.0	8.3	9.5	4.3	15.6
26	.....	47	126.0	31.0	15.6	9.0	5.1	15.6
27	323	41	182.0	19.8	128.0	8.6	5.4	14.4
28	314	36	182.0	19.2	76.0	8.3	4.8	11.9
29	261	33	168.0	23.0	51.0	8.3	4.3	11.9
30	235	33	155.0	47.0	28.0	7.9	4.0	10.4
31	208	.....	89.0	.....	24.0	7.6	.....	10.4

Day.	April.	May.	June.	July.	Day.	April.	May.	June.	July.
1917.					1917.				
1	.....	306	19.4	7.2	16	426.0	102	14.0	5.2
2	.....	388	32.0	7.2	17	245.0	73	13.2	5.0
3	.....	617	34.0	6.5	18	279.0	67	12.4	5.0
4	.....	597	30.0	6.5	19	259.0	58	11.2	5.0
5	.....	330	28.0	6.5	20	1,196.0	57	10.0	4.8
6	.....	627	26.0	6.5	21	1,466.0	57	10.0	4.8
7	.....	807	24.0	6.5	22	926.0	54	9.6	4.5
8	7.0	427	24.0	6.5	23	436.0	36	9.6	4.5
9	7.0	315	20.0	6.2	24	279.0	28	9.0	4.5
10	7.0	248	18.8	5.8	25	336.0	28	9.0	4.0
11	106.0	209	34.0	5.2	26	556.0	28	8.2	4.0
12	82.0	177	33.0	5.2	27	596.0	28	8.2	3.4
13	1,326.0	159	27.0	5.2	28	756.0	27	7.9	3.4
14	1,406.0	140	20.0	5.2	29	516.0	20	7.9	3.2
15	1,416.0	124	17.0	5.2	30	326.0	20	7.2	3.2
					31	.....	20	.....	3.2

NOTE.—1910: Gage read only to nearest tenth of a foot; determinations only roughly approximate; discharge shown for June apparently somewhat low.

1911: Observer absent May 11–16 and May 19–31.

1912: Apr. 1–8, ice present; data inadequate for determination of discharge. Shifting control Apr. 9–30 and July 12 to Aug. 7. No gage readings May 25 to July 11.

1915: Shifting control, Mar. 30 to Apr. 9.

1916: Sept. 21, beavers diverting water above the gage. Small flow continued for period in November.

1917: Apr. 20 to May 1, shifting control. No observations after July 31.

Monthly discharge of Fairwell Creek at Drury's ranch, Sask., 1909–1917.

[Drainage area, 125 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1909.						
June 10–30	471	9.6	86.6	0.642	0.501	3,609
July	364	7.7	44	.326	.376	2,703
August	11.1	4.9	7.3	.054	.062	449
September	5.2	3.8	4.57	.034	.038	272
October	3.8	3.25	3.45	.026	.030	212
The period						7,245
1910.						
April 19–30	22.0	17.0	18.26	.135	.060	434
May	17.0	4.1	13.03	.096	.111	801
June	9.2	4.1	4.95	.037	.041	295
July	4.1	1.3	2.74	.020	.023	169
August	9.2	1.3	2.64	.019	.022	162
September	4.1	.3	1.59	.012	.013	95
October	1.2	.8	.96	.007	.008	59
The period						2,015
1911.						
March 20–31	447.0	2.9	166.00	1.330	.594	3,951
April	512.0	9.5	129.00	1.030	1.150	7,676
May 1–10, 17–18	42.0	17.0	24.20	.194	.087	576
June	11.0	10.0	10.90	.087	.097	649
July	11.0	4.7	8.43	.067	.077	518
August	5.0	2.5	3.72	.030	.035	229
September	4.4	2.3	2.94	.024	.027	175
October 1–28	10.0	2.5	8.45	.068	.071	469
The period					2.138	14,243
1912.						
April 9–30	814	24	313.14	2.50	2.05	13,664
May	23.2	12.18	17.18	.137	.158	1,052
June			8.00	.064	.070	476
July	6.15	4.35	5.26	.042	.049	323
August	9.23	3.27	4.91	.039	.045	302
September	4.72	1.51	4.09	.033	.037	243
October	4.26	3.28	3.87	.031	.036	238
November 1–15	7.00	4.40	6.10	.49	.027	182
The period					2.472	16,480
1913.						
April	354.00	.05	121.56	.972	1.080	7,232
May	18.80	9.30	14.43	.115	.133	885
June	9.80	4.60	7.24	.058	.065	431
July	10.20	3.80	5.70	.046	.053	350
August	4.60	3.00	3.84	.030	.035	236
September	4.60	1.25	2.92	.023	.026	173
October	1.50	.90	1.08	.009	.010	66
The period					1.402	9,373
1914.						
March 8–31	219.00	.60	34.00	.273	.244	1,625
April	308.00	14.30	102.00	.818	.913	6,070
May	29.00	6.00	14.20	.113	.130	873
June	8.50	4.80	6.60	.053	.059	395
July	4.00	1.60	2.60	.020	.023	158
August	1.80	.90	1.21	.010	.011	74
September	4.00	.70	1.22	.010	.011	73
October	2.40	.80	1.08	.008	.009	66
The period					1.400	9,334
1915.						
March 24–31	2.7	1.34	1.53	.012	.01	24
April	294.0	10.00	65.00	.520	.58	3,868
May	40.0	7.40	14.70	.118	.14	904
June	91.0	13.10	64.00	.512	.57	3,808
July	31.0	10.90	15.90	.127	.15	978
August	17.4	4.90	8.90	.071	.08	547
September	4.9	3.10	4.50	.036	.04	268
October	4.9	2.70	3.40	.027	.03	209
The period					1.60	10,606

Monthly discharge of Fairwell Creek at Drury's ranch, Sask., 1909–1917—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1916.						
March 27–31	323.0	208.0	268.0	2.140	0.40	2,657
April	195.0	33.0	98.0	.784	.87	5,831
May	182.0	16.2	49.0	.392	.45	3,013
June	128.0	15.6	48.0	.384	.43	2,856
July	128.0	8.3	25.0	.200	.23	1,537
August	33.0	7.6	12.4	.099	.11	762
September	8.3	4.0	5.8	.046	.05	345
October	26.0	4.0	16.2	.130	.15	996
The period	.....	.....	.....	.....	2.69	17,997
1917.						
April 8–30	1,466.0	7.0	563.0	4.500	3.85	25,677
May	807.0	20.0	199.0	1.590	1.83	12,236
June	34.0	7.2	17.8	.142	.16	1,059
July	7.2	3.2	5.1	.041	.05	314
August	.....	.....	6.5	.052	.06	400
September	.....	.....	6.5	.052	.06	387
October	.....	.....	6.5	.052	.06	400
The period	.....	.....	.....	.....	6.07	40,437

NOTE.—1917; For August, September, and October daily discharge estimated as 6.5 second-feet

Mean monthly discharge, in second-feet, of Fairwell Creek at Drury's ranch, Sask., 1909–1917.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total in acre-feet.
1909	.....	.....	.....	[a]64.0	44.0	7.30	4.60	3.40	.....	[b]7,444
1910	.....	[b]18.3	13.0	5.0	2.7	2.60	1.59	.96	.....	[b]2,015
1911	[c]64.00	129.0	[b]24.0	10.9	8.4	3.70	2.90	[d]8.40	.....	14,290
1912	.....	[b]313.0	[a]17.0	[a]8.0	[a]5.3	4.90	4.10	3.90	[b]6.1	16,480
1913	.....	122.0	14.4	7.2	5.7	3.80	2.90	1.08	.....	9,373
1914	[c]26.00	102.0	14.2	6.6	2.6	1.21	1.22	1.08	.....	9,334
1915	[b]1.53	65.0	14.7	64.0	15.9	8.90	4.50	3.40	.....	10,606
1916	[b]268.00	98.0	49.0	48.0	25.0	12.40	5.80	16.20	.....	17,997
1917	.....	[c]432.0	199.0	17.8	5.1	6.50	6.50	6.50	.....	40,473
Average	45	158	46	26	12.7	5.7	3.8	5.0	.....	16,936
Average run-off, acre-feet	2,767	9,402	2,828	1,547	781	350	226	307	.....	18,208
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	146

[a] Estimated.
[b] Incomplete record not included in average.
[c] Reduced to monthly average.
[d] Average for part of month assumed as monthly average.

BLACKTAIL CREEK AT GARISSERE'S RANCH, SASK.

LOCATION.—In SE. ¼ sec. 31, T. 6, R. 23 W. third meridian, 40 miles southeast of Maple Creek and one-quarter mile upstream from J. Garissere's house.

DRAINAGE AREA.—20 square miles.

RECORDS AVAILABLE.—Discharge measurements only 1909; complete records April 19 to October 31, 1910, and June 14 to August 26, 1911; discharge measurements only 1912–1914.

GAGE.—Vertical staff; read by J. Garissere.

DISCHARGE MEASUREMENTS.—Made with current meter during high stages and with weir at low stages.

CHANNEL AND CONTROL.—Bed of stream is composed of rocks and gravel. Right bank high and steep; left bank gentle slope; both well wooded but subject to overflow during high water. Control may shift during high water.

EXTREMES OF DISCHARGE.—1910–1911: Maximum stage recorded, 1.28 feet, April 19, 1911 (discharge, 0.82 second-foot); no flow July 17 to September 20, 1910, and July 19 to August 26, 1911.

DIVERSIONS.—Water diverted for irrigation by J. Garissere about 150 yards below station.

ACCURACY.—Stage-discharge relation for 1910 and 1911 not permanent. Gage read daily to hundredths. Rating curves poorly defined. Records poor.

Discharge measurements of Blacktail Creek at Garissere's ranch, Sask., 1910–1912.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1910.		*Feet.*	*Sec.-ft.*	1911.		*Feet.*	*Sec.-ft.*
Apr. 19	H. R. Carscallen	1.33	0.46	June 14	G. H. Whyte	0.92	[a]0.138
May 12	do	1.20	.24	July 12	do	.86	.0
31	do	1.06	.16				
June 18	R. G. Swan	.92	.09	1912.			
Oct. 15	do	.85	.06	May 20	J. S. Wright		1.02
				June 11	do		.26
1911.							
Apr. 19	G. H. Whyte	1.28	.820				
May 17	do	1.10	.580				

[a] Weir measurement.

NOTE.—No flow on the following dates on which station was visited by hydrographer: July 16, Aug. 8 and Aug. 29, 1910; July 12 and Aug. 12, 1911; and July 10, Aug. 7, Sept. 7, and Sept. 30, 1912.

Daily discharge, in second-feet, of Blacktail Creek at Garissere's ranch, Sask., 1910-11.

Day.	Apr.	May.	June.	July.	Oct.	Day.	Apr.	May.	June.	July.	Oct.
1910.						1910.					
1		0.28	0.19	0.07		16		0.41	0.12	0.01	0.04
2		.28	.19	.07		17		.41	.12		.07
3		.28	.19	.07		18		.41	.07		.07
4		.28	.19	.07		19	0.41	.28	.07		.07
5		.28	.19	.07		20	.41	.28	.07		.07
6		.28	.19	.07		21	.41	.28	.07		.07
7		.28	.19	.04		22	.41	.28	.07		.07
8		.28	.19	.04		23	.41	.28	.07		.07
9		.28	.19	.04		24	.41	.28	.07		.07
10		.28	.19	.04	0.01	25	.28	.28	.07		.07
11		.28	.19	.04	.01	26	.28	.28	.07		.07
12		.28	.19	.02	.02	27	.28	.41	.07		.07
13		.28	.12	.02	.02	28	.28	.28	.07		.07
14		.28	.12	.02	.04	29	.28	.28	.07		.07
15		.28	.12	.01	.04	30	.28	.19	.07		.07
						31		.19			.07

NOTE.—No flow July 17 to Oct. 9.

Daily discharge, in second-feet, of Blacktail Creek at Garissere's ranch, Sask., 1910–1911—Continued.

Day.	June.	July.	Day.	June.	July.	Day.	June.	July.
1911.			1911.			1911.		
1		0.5	11		0.3	21	0.4	
2		.5	12		.3	22	.4	
3		.5	13		.3	23	.4	
4		.5	14	0.5	.1	24	.5	
5		.5	15	.5	.1	25	.5	
6		.5	16	.5	.1	26	.7	
7		.3	17	.5	.1	27	.7	
8		.3	18	.5	.1	28	.7	
9		.3	19	.4		29	.7	
10		.3	20	.4		30	.5	
						31		

NOTE.—Could not secure an observer before June 14. No flow July 19–31. Probably a small flow in early part of September, but dry during the rest of the fall.

Monthly discharge of Blacktail Creek at Garissere's ranch, Sask., 1910–1911.

[Drainage area, 20 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1910.						
April 19–30	0.41	0.28	0.345	0.043	0.019	8
May	.41	.19	.291	.036	.041	18
June	.19	.07	.126	.016	.018	7
July	.07	.00	.022	.002	.002	1
August						
September						
October	.07	.00	.039	.005	.006	2
The period						36
1911.						
June 14–30	.7	.4	.520	.026	.016	18
July	.5	.0	.181	.009	.010	11
The period					.026	29

NORTH BRANCH OF FRENCHMAN RIVER AT CROSS'S RANCH, SASK.

LOCATION.—In the NE. ¼ sec. 16, Tp. 7, R. 22 W. third meridian, about 6 miles northwest of Eastend.

DRAINAGE AREA.—53 square miles.

RECORDS AVAILABLE.—Open-water flow; incomplete records 1908, 1910, and 1917; complete records 1909 and 1911–1917.

GAGE.—Vertical staff; read by Frank Cross.

DISCHARGE MEASUREMENTS.—Made by wading at station during low stages and at traffic bridge half a mile above station during high stages.

CHANNEL AND CONTROL.—Bed of channel is sand and clay and fairly permanent; left bank low and subject to overflow.

EXTREMES OF STAGE.—1908–1917: Maximum stage recorded, 4.71 feet on April 6, 1913 (discharge, 237 second-feet); minimum stage recorded, 0.40 foot July 18–21, 1910 (discharge, 1.50 second-feet).

DIVERSIONS.—There are a number of small authorized irrigation projects on the main stream and tributaries above this station.

ACCURACY.—Stage-discharge relation practically permanent except during periods of spring break-up, when it is affected by ice. Rating curves fairly well defined. Records fair.

Discharge measurements of North Branch of Frenchman River at Cross's ranch, Sask., 1908–1917.

Date.	Made by—	Gage height.	Discharge.
1908.		*Feet.*	*Sec.-ft.*
July 21	F. T. Fletcher	.....	3.8
21	....do	.....	4.9
25	....do	....	4.0
1909.			
Apr. 19	....do	.....	19.2
May 19	H. R. Carscallen	0.89	19.2
June 26	....do	.795	15.2
July 12	....do	1.025	29.1
Aug. 2	....do	.66	8.7
21	....do	.66	7.1
Sept. 20	....do	.715	8.1
1910.			
Apr. 18	....do	.82	9.38
May 12	....do	.79	9.90
31	....do	.63	6.78
June 17	R. G. Swan	.64	5.66
July 16	....do	.54	3.68
Aug. 6	....do	.63	5.24
29	....do	.66	5.00
Sept. 10	R. J. Burley	.65	6.32
17	H. R. Carscallen	.61	5.13
Oct. 13	R. G. Swan	.67	6.91
1911.			
Apr. 10	G. H. Whyte	3.285	207.32
18	....do	.780	22.40
May 16	....do	.870	23.85
June 13	....do	.460	5.77
July 11	....do	.515	6.82
Aug. 11	....do	.495	6.51
31	G. R. Elliott	.350	3.83
Sept. 6	G. H. Whyte	1.255	49.37
Oct. 16	....do	.540	6.76
1912.			
Apr. 24	....do	1.41	16.26
May 18	J. S. Wright	1.27	9.57
June 10	....do	1.19	6.86
July 8	....do	1.18	6.83
Aug. 5	....do	1.19	7.84
Sept. 6	....do	1.24	7.48
Oct. 10	....do	1.26	9.45
29	....do	1.20	6.81
Nov. 9	....do	1.27	8.82
1913.			
Apr. 19	E. W. W. Hughes	1.37	14.6
24	....do	1.31	9.3
25	....do	1.34	9.8
May 9	....do	1.41	10.3
15	....do	1.37	12.4
June 13	....do	1.28	10.5
13	....do	1.54	[a] 17.6
July 14	....do	1.32	12.0
July 30	E. W. W. Hughes	1.09	5.5
Aug. 21	....do	1.08	5.7
Sept. 15	....do	1.07	4.6
Oct. 11	....do	1.16	6.9
Nov. 3	....do	1.35	6.6
1914.			
Mar. 18	M. H. French	4.15	16.9
26	....do	.....	8.5
Apr. 2	....do	5.05	66.0
13	....do	3.62	70.0
20	....do	1.21	13.1
29	F. R. Steinberger	1.20	10.7
May 19	....do	1.08	7.0
June 18	....do	.95	4.2
July 20	....do	.89	2.5
Aug. 7	....do	.91	2.8
14	E. W. W. Hughes	.95	2.6
27	....do	1.00	4.1
Sept. 11	....do	1.00	4.6
14	....do	1.44	22.0
Oct. 10	....do	1.20	13.1
1915.			
Apr. 5	M. H. French	2.75	76.0
8	....do	1.11	14.6
15	....do	.93	11.2
May 7	J. E. Caughey	.85	7.6
June 15	....do	.78	9.1
July 12	....do	.73	7.4
Aug. 3	....do	.74	7.4
23	....do	.71	7.7
Sept. 11	G. H. Whyte and J. E. Caughey	.72	7.9
24	....do	.72	7.5
Oct. 13	....do	.73	9.4
28	....do	.72	10.2
1916.			
Mar. 22	M. H. French	(*b*)	[c] 138.0
Apr. 3	....do	3.38	[d] 18.4
10	....do	1.34	[d] 33.0
May 8	J. E. Caughey	.70	12.4
June 8	....do	.62	8.8
July 10	....do	.64	7.4
24	....do	.63	5.7
Aug. 30	L. P. B. Miles	.65	5.6
Oct. 27	....do	.76	9.8
1917.			
Apr. 19	M. H. French	.....	37.0
May 8	....do	1.93	102.0
June 9	....do	.80	11.1
July 19	....do	.31	2.2
Sept. 15	....do	.53	6.9
Oct. 29	....do	.87	11.0

[a] F. Cross emptying his reservoir.
[b] Gage inaccessible.
[c] Weir measurements over Cross's dam.
[d] Ice going out.

Daily discharge, in second-feet, of North Branch of Frenchman River at Cross's ranch, Sask., 1908–1917.

Day.	Aug.	Sept.	Oct.	Day.	Aug.	Sept.	Oct.	Day.	Aug.	Sept.	Oct.
1908.				1908.				1908.			
1	2.1	5.6	5.6	11	2.1	5.6	9.7	21	5.6	5.6	.....
2	2.1	5.6	5.6	12	5.6	5.6	9.7	22	5.6	5.6	.....
3	2.1	5.6	5.6	13	5.6	5.6	9.7	23	5.6	5.6	.....
4	2.1	5.6	5.6	14	5.6	5.6	9.7	24	5.6	5.6	.....
5	2.1	5.6	9.7	15	5.6	5.6	9.7	25	5.6	5.6	.....
6	2.1	5.6	9.7	16	5.6	5.6	9.7	26	5.6	5.6	.....
7	2.1	5.6	9.7	17	5.6	5.6	9.7	27	5.6	5.6	.....
8	5.6	5.6	9.7	18	5.6	5.6	9.7	28	5.6	5.6	.....
9	5.6	5.6	9.7	19	5.6	5.6	9.7	29	5.6	5.6	.....
10	2.1	5.6	9.7	20	5.6	5.6	.....	30	5.6	5.6	.....
								31	5.6	.....	.....

Daily discharge, in second-feet, of North Branch of Frenchman River at Cross's ranch, Sask., 1908–1917—Continued.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1909.							1909.						
1	14.9	20.1	9.7	9.7	7.65	7.65	16	20.1	9.7	9.7	7.65	9.7	12.3
2	20.1	14.9	9.7	7.65	7.65	7.65	17	a41.3	9.7	9.7	7.65	7.65	12.3
3	a41.3	14.9	9.7	7.65	7.65	7.65	18	a36.0	9.7	20.1	7.65	7.65	12.3
4	a62.6	14.9	9.7	7.65	9.7	7.65	19	20.1	9.7	20.1	7.65	9.7	12.3
5	a62.6	14.9	a46.6	7.65	9.7	7.65	20	20.1	a46.6	14.9	7.65	9.7	12.3
6	a41.3	14.9	a30.7	7.65	9.7	7.65	21	20.1	78.8	9.7	7.65	9.7	12.3
7	25.4	14.9	14.9	7.65	9.7	7.65	22	14.9	25.4	9.7	5.6	9.7	12.3
8	a36.0	20.1	14.9	9.7	9.7	7.65	23	20.1	20.1	9.7	5.6	7.65	9.7
9	20.1	20.1	14.9	7.65	9.7	9.7	24	20.1	14.9	9.7	5.6	7.65	9.7
10	20.1	20.1	14.9	7.65	9.7	9.7	25	20.1	14.9	9.7	5.6	7.65	9.7
11	25.4	20.1	a30.7	7.65	9.7	9.7	26	20.1	14.9	9.7	5.6	7.65	9.7
12	25.4	14.9	25.4	7.65	9.7	12.3	27	20.1	14.9	20.1	7.65	7.65	9.7
13	20.1	14.9	20.1	7.65	7.65	12.3	28	20.1	14.9	20.1	7.65	7.65	9.7
14	20.1	14.9	14.9	7.65	7.65	12.3	29	20.1	14.9	14.9	7.65	7.65	9.7
15	20.1	9.7	9.7	7.65	9.7	12.3	30	20.1	14.9	12.3	7.65	7.65	9.7
							31	20.1	.....	9.7	7.65	7.65	9.7

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1910.								
1	12.0	9.4	4.9	2.95	2.95	5.9	7.0	.....
2	12.0	9.4	5.9	3.90	2.95	5.9	7.0	.....
3	12.0	9.4	5.9	3.90	2.95	5.9	7.0	.....
4	12.0	9.4	7.0	4.90	3.9	7.0	7.0	.....
5	12.0	9.4	5.9	4.90	3.9	7.0	7.0	.....
6	12.0	9.4	5.9	4.90	4.9	7.0	7.0	.....
7	12.0	9.4	4.9	4.90	4.9	7.0	7.0	.....
8	12.0	9.4	4.9	4.90	4.9	7.0	7.0	.....
9	12.0	9.4	4.9	4.90	4.9	7.0	7.0	.....
10	12.0	9.4	4.9	4.90	4.9	5.9	7.0	.....
11	12.0	9.4	4.9	4.90	4.9	5.9	7.0	.....
12	12.0	9.4	4.9	4.90	4.9	5.9	7.0	.....
13	12.0	9.4	4.9	4.90	4.9	5.9	7.0	.....
14	12.0	9.4	4.9	3.90	4.9	5.9	7.0	.....
15	12.0	9.4	4.9	3.90	4.9	5.9	7.0	.....
16	10.7	9.4	4.9	2.95	4.9	5.9	7.0	.....
17	10.7	9.4	5.9	2.15	4.9	4.9	7.0	.....
18	9.4	9.4	4.9	1.50	4.9	4.9	7.0	.....
19	9.4	9.4	4.9	1.50	4.9	4.9	7.0	.....
20	9.4	9.4	4.9	1.50	4.9	5.9	7.0	.....
21	9.4	9.4	4.9	1.50	4.9	5.9	7.0	.....
22	9.4	9.4	4.9	2.15	4.9	5.9	7.0	.....
23	9.4	9.4	4.9	2.95	4.9	5.9	7.0	.....
24	9.4	9.4	4.9	2.95	4.9	5.9	8.2	.....
25	9.4	8.2	4.9	2.95	4.9	7.0	8.2	.....
36	9.4	8.2	3.9	2.95	5.9	7.0	9.4	.....
27	9.4	7.0	3.9	2.95	5.9	7.0	9.4	.....
28	9.4	7.0	2.95	2.95	5.9	7.0	9.4	.....
29	9.4	5.9	2.95	2.95	5.9	7.0	9.4	.....
20	9.4	5.9	2.95	2.95	5.9	7.0	9.4	.....
31	.....	4.9	.....	2.95	5.9	.....	9.4	.....

a Interpolated.

Daily discharge, in second-feet, of North Branch of Frenchman River at Cross's ranch, Sask., 1908–1917—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1911.								
1	.....	15.0	5.8	15.0	6.2	6.0	9.4	.....
2	.....	15.0	5.8	19.0	6.2	6.0	13.6	.....
3	.....	15.0	5.8	9.8	6.2	5.8	15.5	.....
4	.....	15.0	5.0	8.8	6.2	16.0	13.6	.....
5	.....	15.0	8.8	9.4	8.4	18.5	9.8	.....
6	.....	10.5	7.0	8.8	8.4	48.0	9.4	.....
7	.....	10.5	8.0	8.8	8.8	17.5	8.8	.....
8	.....	10.5	8.0	8.8	11.4	9.4	8.4	.....
9	.....	10.5	8.0	10.5	9.1	7.7	8.0	.....
10	225.0	10.5	8.0	10.5	7.7	7.4	7.7	.....
11	121.0	10.5	7.0	8.8	7.0	6.8	8.0	.....
12	97.0	10.5	7.0	7.0	6.5	6.2	8.4	.....
13	81.0	10.5	7.0	7.0	5.8	8.0	8.4	.....
14	73.0	15.0	6.5	6.5	5.5	7.7	8.8	.....
15	31.0	15.0	5.2	6.5	6.8	7.0	8.8	.....
16	45.0	17.5	4.5	6.2	6.5	7.0	8.4	.....
17	52.0	15.0	4.5	6.2	6.0	8.8	8.4	.....
18	31.0	15.0	4.5	6.2	6.0	9.1	9.8	.....
19	31.0	12.8	4.5	7.0	5.8	8.8	11.4	.....
20	31.0	12.8	6.5	7.0	5.8	8.0	10.5	.....
21	25.0	11.8	7.7	7.0	5.8	7.7	10.5	.....
22	31.0	11.8	8.0	7.0	5.8	10.5	9.8	.....
23	15.0	17.5	6.5	7.0	6.5	11.0	11.0	.....
24	15.0	13.6	4.5	6.5	6.5	11.4	12.8	.....
25	15.0	13.6	4.5	6.2	5.8	11.4	16.5	.....
26	15.0	15.0	15.0	5.8	8.4	11.8	17.0	.....
27	15.0	15.0	7.7	5.8	8.0	10.5	32.0	.....
28	15.0	12.8	7.0	5.2	6.5	10.2	28.0	.....
29	15.0	12.8	7.0	5.2	6.2	9.8	27.0	.....
30	15.0	12.8	15.0	6.5	6.0	9.4	25.0	.....
31	.....	10.5	.....	6.5	6.0	.....	.....	.....
1912.								
1	.....	11.53	8.12	6.62	5.72	5.90	7.02	10.35
2	.....	10.80	7.68	6.62	7.90	5.90	7.02	18.80
3	.....	11.25	5.90	6.08	6.80	6.62	7.24	17.60
4	.....	11.53	5.90	5.90	6.80	6.80	7.02	17.30
5	.....	11.80	6.26	5.72	7.02	7.90	7.02	17.30
6	.....	12.07	6.44	6.62	6.44	8.12	7.24	17.60
7	.....	14.00	6.44	6.26	6.08	7.68	7.46	19.40
8	.....	11.25	6.44	6.44	5.90	7.24	7.46	22.25
9	.....	10.80	6.26	6.08	5.36	6.80	10.80	8.56
10	.....	10.35	6.62	6.08	5.36	6.44	9.00	8.34
11	101.75	9.90	6.80	5.90	5.36	6.26	8.12	9.00
12	48.95	9.90	6.44	5.90	5.36	6.26	7.90	17.60
13	33.90	9.68	28.50	5.72	5.36	6.62	7.90	18.50
14	20.00	9.45	17.00	5.72	5.36	9.68	7.68	18.50
15	27.50	9.00	24.50	6.26	5.36	8.56	7.46	17.90
16	26.00	8.12	12.63	5.72	7.46	7.68	7.46	.....
17	19.40	8.12	6.80	5.90	7.46	7.24	7.24	.....
18	32.80	8.12	5.90	5.90	6.08	7.02	7.02	.....
19	17.90	8.34	5.54	5.90	7.90	7.46	7.02	.....
20	15.50	8.78	4.85	5.72	7.46	7.24	9.68	.....
21	14.60	8.34	4.70	5.72	6.26	7.90	9.45	.....
22	12.07	8.34	4.70	5.90	5.90	8.34	9.22	.....
23	12.07	8.12	4.55	5.72	5.90	8.34	8.78	.....
24	11.80	8.12	4.40	5.54	5.54	8.12	8.12	.....
25	12.63	7.90	4.25	5.72	5.72	8.12	8.12	.....
26	11.80	7.68	4.10	5.54	5.90	7.90	8.12	.....
27	11.25	8.12	3.95	5.90	6.80	7.68	7.90	.....
28	11.02	26.00	3.95	5.90	6.80	7.90	7.90	.....
29	11.25	13.17	4.10	5.90	6.62	7.68	7.68	.....
30	11.80	8.12	4.10	5.72	6.26	7.24	12.63	.....
31	.....	8.34	.....	5.72	5.90	.....	14.60	.....

Daily discharge, in second-feet, of North Branch of Frenchman River at Cross's ranch, Sask., 1908–1917—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1913.								
1	232.0	11.1	8.0	8.7	5.1	6.2	5.7	.....
2	212.0	12.1	8.0	10.0	5.0	5.3	5.7	.....
3	210.0	10.6	7.8	9.7	4.7	5.3	5.8	.....
4	212.0	10.0	7.6	18.2	4.4	5.3	6.2	.....
5	212.0	13.6	7.2	12.9	5.2	5.2	6.6	.....
6	237.0	10.3	6.1	10.0	6.2	5.1	7.7	.....
7	212.0	9.4	5.7	12.3	5.9	4.7	8.0	.....
8	186.0	11.5	5.1	8.7	5.9	4.8	7.5	.....
9	112.0	10.3	4.8	7.6	5.9	5.0	7.3	.....
10	129.0	10.6	4.2	8.6	9.4	5.0	6.9	.....
11	119.0	9.6	3.1	11.4	6.8	4.8	6.9	.....
12	114.0	9.9	3.8	8.3	5.5	4.7	6.9	.....
13	48.0	10.2	10.4	7.8	5.1	4.7	6.7	.....
14	33.0	13.4	9.7	12.0	6.1	4.7	6.9	.....
15	18.0	19.3	6.4	10.0	7.7	4.6	7.1	.....
16	14.0	12.2	3.1	10.6	6.0	4.9	7.1	.....
17	14.0	12.2	2.9	8.5	5.8	5.1	7.6	.....
18	13.0	11.6	15.6	6.3	6.4	5.1	8.0	.....
19	14.0	11.1	4.9	6.0	6.4	5.3	8.8	.....
20	14.3	11.1	[a] 37.0	6.2	5.6	5.5	8.3	.....
21	13.6	10.5	14.1	6.2	5.7	5.6	8.0	.....
22	12.4	10.3	9.8	6.3	5.5	5.9	7.4	.....
23	11.1	10.3	11.2	6.6	5.5	9.8	6.7	.....
24	9.3	10.1	16.7	5.8	5.5	8.3	6.5	.....
25	10.1	10.1	14.8	5.7	5.4	6.8	6.3	.....
26	9.7	9.9	17.4	5.9	5.0	6.4	6.3	.....
27	9.6	9.9	14.2	6.0	5.0	6.2	6.5	.....
28	10.0	9.6	11.3	5.9	5.0	6.0	6.3	.....
29	10.7	9.4	10.5	5.4	5.0	5.8	6.1	.....
30	10.1	9.4	10.0	5.5	5.2	5.8	6.7	.....
31	.....	9.2	.....	5.3	6.2	.....	7.1	.....
1914.								
1	70.0	10.7	6.8	5.4	3.0	5.2	5.9	.....
2	66.0	11.5	6.5	4.9	3.2	4.9	5.9	.....
3	25.0	11.5	4.9	4.7	3.4	4.5	5.7	.....
4	74.0	11.5	7.4	4.2	3.2	4.5	9.3	.....
5	88.0	15.0	16.0	4.2	3.2	4.5	11.1	.....
6	90.0	16.5	11.1	4.0	3.0	4.9	10.4	.....
7	102.0	16.5	9.0	3.6	3.2	4.9	8.3	.....
8	96.0	16.5	7.1	3.6	3.0	5.2	18.0	.....
9	60.0	12.3	5.4	3.8	4.0	6.5	18.0	.....
10	47.0	12.7	5.7	3.8	4.9	5.7	11.1	.....
11	49.0	12.7	5.7	4.0	4.2	4.9	8.3	.....
12	69.0	12.3	6.8	4.0	4.0	6.2	8.0	.....
13	65.0	11.9	7.4	4.2	4.5	16.5	8.0	.....
14	37.0	11.9	16.0	3.8	4.0	24.0	8.0	.....
15	30.0	11.5	8.0	3.4	3.8	16.5	7.4	.....
16	26.0	11.1	5.2	3.4	3.6	10.4	7.1	.....
17	25.0	7.7	4.7	3.2	3.6	7.4	7.4	.....
18	18.0	7.7	3.8	3.0	5.7	5.9	7.1	.....
19	18.0	7.4	3.8	3.0	5.2	5.9	7.4	.....
20	18.0	4.9	3.8	2.8	4.7	5.7	7.4	.....
21	18.0	4.7	5.4	2.8	3.8	5.7	7.4	.....
22	17.5	4.9	7.1	2.8	3.8	5.7	7.7	.....
23	17.0	4.9	4.0	2.6	4.0	5.7	7.7	.....
24	16.5	8.3	7.1	2.6	7.7	5.7	7.7	.....
25	16.0	8.0	7.1	3.0	6.2	5.7	7.7	.....
26	16.5	7.4	8.0	3.8	5.7	5.7	7.7	.....
27	16.5	7.1	6.8	3.4	5.7	5.9	8.0	.....
28	11.5	6.2	6.2	3.2	5.4	5.9	8.3	.....
29	11.1	6.8	5.9	3.2	5.4	5.9	8.3	.....
30	11.5	7.1	5.9	3.0	5.4	5.9	8.7	.....
31	.....	7.1	.....	2.8	5.2	.....	8.7	.....

[a] F. Cross emptying his reservoir.

Daily discharge, in second-feet, of North Branch of Frenchman River at Cross's ranch, Sask., 1908–1917—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1915.								
1	.....	8.2	8.5	8.9	8.1	6.4	8.1	.....
2	.....	8.0	23.0	8.1	8.0	8.4	8.5	.....
3	.....	8.0	15.6	7.8	7.8	8.0	11.1	.....
4	157.0	7.6	16.0	8.9	7.8	7.8	10.4	.....
5	63.0	7.6	12.2	7.8	7.6	7.8	10.2	.....
6	25.0	7.6	11.7	7.6	7.4	7.6	10.2	.....
7	20.0	7.5	10.2	7.5	7.4	7.5	10.2	.....
8	19.0	7.5	10.2	12.0	6.9	8.0	9.9	.....
9	14.1	7.5	9.9	9.4	6.8	8.7	9.4	.....
10	12.8	7.5	9.7	9.0	6.7	8.0	9.0	.....
11	12.0	7.5	10.1	8.4	6.7	7.6	9.9	.....
12	11.7	7.4	10.2	7.4	6.9	8.1	9.4	.....
13	12.0	7.6	9.6	7.4	6.8	8.4	9.4	.....
14	11.7	9.7	8.7	7.8	6.8	8.9	9.4	.....
15	11.1	13.7	9.0	9.4	6.8	8.5	9.4	.....
16	10.9	17.0	9.0	8.1	6.8	8.1	9.4	.....
17	10.9	10.9	9.9	9.4	6.8	7.8	9.4	.....
18	10.4	8.9	9.4	10.4	6.9	7.8	9.4	.....
19	10.4	8.7	9.4	8.7	18.8	7.6	9.4	.....
20	10.1	8.5	18.0	8.1	9.6	8.0	9.4	.....
21	9.7	8.9	11.8	8.0	7.8	7.8	9.6	.....
22	9.6	8.9	10.2	7.8	7.6	7.6	9.6	.....
23	9.6	8.9	9.9	8.5	7.2	7.5	9.6	.....
24	9.6	7.5	8.5	9.4	7.2	7.5	9.6	.....
25	9.4	8.0	8.5	8.4	7.1	7.5	11.7	.....
26	9.2	15.0	11.1	8.1	6.9	7.5	10.6	.....
27	9.0	11.7	10.2	11.1	6.8	7.8	10.6	.....
28	8.5	8.5	8.4	8.4	6.7	8.1	10.2	.....
29	8.4	9.6	8.1	9.0	6.6	8.1	10.2	.....
30	8.1	10.2	7.8	9.0	6.6	8.1	10.1	.....
31	.....	8.7	.....	8.1	6.4	.....	10.1	.....
1916.								
1	33.0	15.2	13.4	5.7	6.6	6.6	8.2	.....
2	25.0	14.6	13.2	4.8	6.4	6.6	8.6	.....
3	18.4	14.2	11.5	6.9	6.2	6.4	8.6	.....
4	18.8	14.3	9.8	9.4	5.9	6.8	13.7	.....
5	8.4	13.3	9.8	7.8	6.4	8.1	12.6	.....
6	23.0	12.6	15.4	6.9	7.8	7.2	11.7	.....
7	37.0	12.3	11.5	6.4	7.1	8.2	9.9	.....
8	27.0	12.4	8.8	6.6	6.2	7.2	9.9	.....
9	25.0	12.4	9.1	6.0	8.0	7.6	10.1	.....
10	33.0	12.6	10.0	6.3	7.6	7.5	9.7	.....
11	32.0	12.1	12.4	6.0	7.2	7.4	9.4	.....
12	28.0	11.8	14.7	5.9	6.9	6.8	9.0	.....
13	27.0	11.9	11.2	5.8	6.7	6.7	8.6	.....
14	27.0	11.8	7.2	5.8	6.6	7.1	8.1	.....
15	26.0	13.3	6.6	5.8	6.4	7.4	7.8	.....
16	25.0	12.8	6.8	5.8	6.4	7.1	8.2	.....
17	17.4	13.8	6.8	5.7	6.3	7.2	9.0	.....
18	21.0	12.4	6.8	7.6	6.4	6.8	9.9	.....
19	18.0	11.6	6.6	6.9	6.3	6.9	11.7	.....
20	17.4	11.4	6.6	6.4	6.2	6.8	8.9	.....
21	17.0	9.8	5.2	6.0	6.2	6.9	8.2	.....
22	16.4	9.8	7.6	5.9	6.0	7.2	9.0	.....
23	16.1	9.7	9.6	5.8	6.0	7.4	9.9	.....
24	15.4	10.2	6.6	6.3	5.9	7.2	9.2	.....
25	15.1	16.4	5.7	6.0	5.9	7.2	8.9	.....
26	14.8	16.8	5.2	7.8	6.6	7.4	8.6	.....
27	14.6	26.0	5.2	12.2	6.4	9.7	7.8	.....
28	14.2	20.0	5.1	8.2	6.4	10.1	9.7	.....
29	13.9	19.3	5.7	6.9	6.3	8.2	9.7	.....
30	15.6	14.8	8.0	8.1	6.4	8.0	9.7	.....
31	.....	13.8	.....	6.9	6.6	.....	10.1	.....

Daily discharge, in second-feet, of North Branch of Frenchman River at Cross's ranch, Sask., 1908–1917—Continued.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1917.							1917.						
1	39.0	7.6	5.3	4.0	6.5	5.6	16	22.0	5.4	3.5	4.2	5.8	8.3
2	65.0	7.6	5.4	4.4	6.3	6.0	17	10.8	5.6	3.1	4.0	5.6	8.1
3	97.0	11.0	5.4	5.8	7.4	6.2	18	10.5	5.4	2.7	4.0	5.6	9.0
4	87.0	8.3	7.8	5.4	7.2	6.2	19	9.9	5.4	2.6	4.0	5.4	9.9
5	92.0	8.9	5.8	5.3	7.1	6.3	20	9.6	5.6	2.4	3.8	5.4	10.8
6	87.0	8.3	4.9	5.1	6.3	6.3	21	9.0	5.6	4.0	4.0	5.4	11.8
7	162.0	5.6	4.5	4.9	5.4	6.5	22	8.9	5.6	4.0	4.5	5.4	12.9
8	102.0	6.0	4.4	5.1	5.8	6.3	23	8.7	6.0	3.6	4.5	5.6	21.0
9	68.0	11.2	4.4	4.9	8.1	6.2	24	8.3	9.2	3.6	4.4	7.6	21.0
10	68.0	5.8	4.2	6.7	7.8	6.2	25	8.1	8.3	3.1	4.5	10.3	21.0
11	64.0	7.4	4.0	6.0	7.2	6.0	26	8.1	6.5	3.1	4.5	7.6	18.0
12	55.0	7.8	4.0	5.1	6.7	6.0	27	8.0	5.6	3.5	4.4	7.2	18.0
13	39.0	6.5	3.8	4.9	6.5	6.3	28	7.8	5.6	4.0	4.4	6.2	14.0
14	35.0	5.6	3.8	4.5	6.5	6.3	29	7.4	5.4	4.9	4.2	5.8	11 0
15	26.0	5.6	3.6	4.4	6.3	8.1	30	7.2	5.3	4.5	4.9	5.8	12.0
							31	[a]7.4	.....	4.2	6.7	.....	12.0

[a] Estimated.

NOTE.—1911: No observations previous to Apr. 10. Ice in stream; data inadequate for determination of daily discharge after Oct. 31.
1913: Shifting-control method used to determine discharge Apr. 19 to Oct. 10.
1914: Stage-discharge relation affected by ice Apr. 1–15.
1915: Shifting control Apr. 16 to July 12 and Sept. 23 to Oct 31.
1916: Shifting control Apr. 1 to June 13.
1917: Run-off in April heavy; could not be measured because of snows. Stage-discharge relation changed by ice Oct. 25–31.

Monthly discharge of North Branch of Frenchman River at Cross's ranch, Sask., 1908–1917.

[Drainage area, 53 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1908.						
August	5.6	2.1	4.6	0.079	0.091	282
September	5.6	5.6	5.6	.097	.108	333
October 1–19	9.7	5.6	8.8	.152	.107	333
The period	.....	.....	.....	.....	.....	948
1909.						
May	63	14.9	26.1	.450	.519	1,605
June	79	9.7	18.6	.321	.358	1,107
July	47	9.7	15.7	.270	.311	965
August	10	5.6	7.5	.128	.148	458
September	10	7.6	8.7	.150	.167	515
October	12	7.6	10.1	.174	.201	621
The period	.....	.....	.....	.....	.....	5,271
1910.						
April	12.0	9.40	10.79	.186	.208	643
May	9.4	4.90	8.80	.152	.175	541
June	7.0	2.95	4.88	.084	.094	290
July	4.9	1.50	3.46	.060	.069	214
August	5.9	2.95	4.84	.084	.097	298
September	7.0	4.90	6.24	.108	.121	371
October	9.4	7.00	7.54	.130	.150	464
The period	.....	.....	.....	.....	.....	2,821

Monthly discharge of North Branch of Frenchman River at Cross's ranch, Sask., 1908–1917—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1911.						
April 10–30	225.0	15.0	47.30	0.892	0.696	1,973
May	17.5	10.5	13.20	.249	.287	812
June	15.0	4.5	7.01	.132	.147	417
July	19.0	5.2	7.95	.150	.173	489
August	11.4	5.5	6.83	.129	.149	420
September	48.0	5.8	10.80	.204	.228	643
October	32.0	7.7	13.40	.253	.292	824
The period					1.972	5,578
1912.						
Apr. 11–30	101.75	11.02	23.20	.44	.33	928
May	26.00	7.68	10.23	.19	.22	629
June	28.50	3.95	7.58	.14	.16	451
July	6.62	5.54	5.94	.11	.13	365
August	7.90	5.36	6.26	.12	.14	385
September	9.68	5.90	7.42	.14	.16	442
October	14.60	7.02	8.30	.16	.18	510
November	22.25	8.34	15.90	.30	.17	473
The period					1.49	4,183
1913.						
April	237.0	9.3	82.1	1.550	1.73	4,885
May	13.9	9.2	10.4	.196	.23	640
June	37.0	2.9	9.7	.183	.20	578
July	18.2	5.3	8.3	.157	.18	510
August	9.4	4.4	5.7	.108	.12	350
September	9.8	4.6	5.6	.106	.12	333
October	8.8	5.7	7.0	.132	.15	430
The period					2.73	7,726
1914.						
April	102.0	11.1	41.0	.770	.86	2,428
May	16.5	4.7	9.9	.186	.21	608
June	16.0	3.8	7.0	.131	.15	414
July	5.4	2.6	3.6	.067	.08	219
August	7.7	3.0	4.4	.083	.10	269
September	24.0	4.5	7.1	.133	.15	421
October	18.0	5.7	8.6	.163	.19	531
The period					1.74	4,890
1915.						
April 4–30	157.0	8.1	19.0	.358	.36	1,017
May	17.0	7.4	9.1	.172	.20	560
June	23.0	8.1	10.8	.204	.23	643
July	12.0	7.4	8.6	.162	.19	529
August	18.8	6.4	7.5	.142	.16	461
September	8.9	6.4	7.9	.149	.17	470
October	11.7	8.1	9.8	.185	.21	603
The period					1.52	4,283
1916.						
April	37.0	8.4	21.0	.396	.44	1,250
May	26.0	9.7	13.7	.258	.30	842
June	15.4	5.1	8.7	.164	.18	518
July	12.2	4.8	6.7	.126	.15	412
August	8.0	5.9	6.5	.123	.14	398
September	10.1	6.4	7.4	.140	.16	440
October	13.7	7.8	9.5	.179	.21	584
The period					1.58	4,444
1917.						
May	162.0	7.2	40.0	.755	.87	2,460
June	11.2	5.3	6.8	.128	.14	405
July	7.8	2.4	4.1	.077	.09	252
August	6.7	3.8	4.8	.091	.10	295
September	10.3	5.4	6.5	.123	.14	387
October	21.0	5.6	10.1	.191	.22	621
The period					1.56	4,420

NOTE.—The discharge for April, 1917, could not be computed because of the effect of snow.

Mean monthly discharge, in second-feet, of North Branch of Frenchman River at Cross's ranch, Sask., 1908–1917.

Year.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total in acre-feet.
1908	.....	.....	.....	.....	4.6	5.6	[a] 8.8	.....	[a] 948
1909	.....	26.0	18.6	15.7	7.5	8.7	10.1	.....	5,271
1910	10.8	8.8	4.9	3.5	4.8	6.2	7.5	.....	2,821
1911	[a] 47.0	13.2	7.0	8.0	6.8	10.8	13.4	.....	5,578
1912	[a] 23.0	10.2	7.6	5.9	6.3	7.4	8.3	[a] 15.9	4,183
1913	82.0	10.4	9.7	8.3	5.7	5.6	7.0	.....	7,726
1914	41.0	9.9	7.0	3.6	4.4	7.1	8.6	.....	4,890
1915	[a] 19.0	9.1	10.8	[b] 8.6	[b] 7.5	[b] 7.9	[b] 9.8	.....	4,283
1916	21.0	13.7	8.7	6.7	6.5	7.4	9.5	.....	4,444
1917	(c)	40.0	6.8	4.1	4.8	6.5	10.1	.....	[a] 4,420
Average	39	15.7	9.0	7.2	5.9	7.3	9.4	.....	4,900
Average run-off, acre-feet	2,321	965	536	443	363	434	578	.....	5,640
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	106

[a] Incomplete record not included in average.
[b] Record published in report for 1913 has been revised.
[c] Heavy run-off April, 1917, not measured.

ROSE CREEK AT DORRELL, SASK.

LOCATION.—In NE. ¼ sec. 26, T. 7, R. 22 W. third meridian, 40 feet upstream from trail to post office from Maple Creek, 100 feet from Dorrell post office.

DRAINAGE AREA.—13 square miles.

RECORDS AVAILABLE.—Open-water flow May 1, 1911, to October 31, 1914.

GAGE.—Vertical staff; on June 16, 1913, a permanent weir was installed and observations after that date are for the gage above this weir. Gages read by B. E. Rose.

DISCHARGE MEASUREMENTS.—Made with current-meter during high stages and with weir at low stages.

CHANNEL AND CONTROL.—Bed of stream sandy; right bank low; subject to overflow; left bank high; not subject to overflow. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 2.45 feet April 5, 1913 (discharge, 37 second-feet); minimum stage recorded 0.02 foot (no flow) July 28, 30, and 31, and August 5, 1914.

ICE.—No records during winter season.

DIVERSIONS.—B. E. Rose diverted water for irrigation above this station.

Discharge measurements of Rose Creek at Dorrell, Sask., 1911–1914.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1911.		*Feet.*	*Sec.-ft.*	1913.		*Feet.*	*Sec.-ft.*
May 2	G. H. Whyte	1.120	[a] 0.684	Apr. 25	E. W. W. Hughes	0.89	0.73
June 3	do	.960	[a] .420	June 17	do	.76	.36
July 5	do	1.040	[a] .520	Oct. 11	do	.73	.21
26	do	.770	[a] .857	Nov. 1	do	.60	.21
Aug. 31	do	.765	[a] .536				
Oct. 4	do	1.130	[a] .714	1914.			
				Mar. 26	M. H. French	.....	[a] .12
1912.				Apr. 29	F. R. Steinberger	.16	[a] .64
Apr. 23	G. H. Whyte	1.275	3.20	May 19	do	.18	[a] .75
June 4	J. S. Wright	1.01	.53	June 11	do	.15	[a] .58
25	do	.86	[a] .246	July 8	do	.10	[a] .05
July 26	do	.73	[a] .172	Aug. 1	do	.02	[a] 0
Aug. 22	do	.71	[a] .182	26	E. W. W. Hughes	.14	[a] .07
Sept. 23	do	.86	[a] .481	Sept. 11	do	.11	[a] .06
Oct. 29	do	.76	[a] .312				
Nov. 9	do	.83	[a] .55				

[a] Measurements made with permanent weir.

Daily discharge, in second-feet, of Rose Creek at Dorrell, Sask., 1911–1914.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1911.								
1	.....	0.45	0.43	0.90	0.04	0.03	0.35	0.35
2	.....	.69	.41	.94	.04	.04	.65	.35
3	.....	.63	.45	.55	.04	.03	.88	.35
4	.....	.59	.41	.53	.04	.47	.65	.35
5	.....	.53	.86	.53	.11	.....	.55	.35
6	.....	.55	.57	.53	.21	.....	.45	.37
7	.....	.55	.53	.35	.49	.96	.41	.37
8	.....	.55	.55	.33	.45	.75	.35	.26
9	.....	.55	.45	.47	.26	.55	.35	.28
10	.....	.57	.35	.45	.17	.35	.35	.26
11	.....	.67	.31	.31	.23	.33	.31	.28
12	.....	.57	.26	.26	.10	.17	.33	.17
13	.....	.55	.26	.19	.04	.35	.33	.17
14	.....	.98	.26	.17	.04	.35	.33	.22
15	.....	.86	.26	.14	.17	.26	.33	.17
16	.....	1.13	.17	.13	.04	.17	.31	.....
17	.....	.92	.17	.10	.05	.17	.31	.....
18	.....	.75	.17	.10	.04	.35	.33	.....
19	.....	.73	.35	.17	.04	.30	.41	.....
20	.....	.75	1.38	.17	.03	.26	.45	.....
21	.....	.65	1.13	.10	.04	.19	.43	.....
22	.....	.55	.73	.04	.04	.41	.55	.....
23	.....	.94	.45	.08	.04	.53	.45	.....
24	.....	.75	.96	.04	.04	.55	.55	.....
25	.....	.92	.79	.02	.03	.55	.35	.....
26	.....	.86	.75	.04	.04	.65	.33	.....
27	.....	.75	.45	.04	.09	.53	.33	.....
28	.....	.65	.69	.04	.03	.35	.33	.....
29	.....	.63	.53	.04	.04	.35	.33	.....
30	.....	.55	.96	.05	.04	.35	.33	.....
31	.....	.47	.....	.04	.03	.....	.35	.....
1912.								
1	.....	1.03	.50	.33	.18	.26	.28	.31
2	.....	1.73	.36	.28	.26	.34	.26	.28
3	.....	1.10	.30	.24	.31	.28	.26	.28
4	.....	1.23	.40	.23	.25	.50	.26	.31
5	.....	1.03	.48	.23	.23	.67	.26	.31
6	.....	1.17	.45	.29	.19	.49	.26	.34
7	.....	1.33	.42	.25	.20	.26	.26	.37
8	23.56	1.10	.38	.42	.18	.20	.89	.37
9	27.11	1.33	.45	.36	.17	.20	.70	.48
10	26.64	1.10	.50	.32	.18	.20	.89	.40
11	17.13	1.03	.30	.28	.17	.17	.79	.28
12	10.23	1.03	.29	.23	.17	.14	.45	.28
13	9.27	1.03	.35	.19	.18	.29	.36	.31
14	9.99	1.03	4.51	.48	.18	.81	.34	.31
15	8.09	.57	5.71	.42	.19	.40	.33	.28
16	6.18	.36	1.33	.21	.43	.33	.33	.....
17	4.75	.33	.90	.20	.24	.21	.41	.....
18	3.32	.36	.38	.20	.38	.21	.65	.....
19	3.32	.36	.35	.18	.63	.44	.88	.....
20	3.32	.40	.28	.19	.27	.36	.66	.....
21	3.32	.35	.30	.19	.21	.36	.79	.....
22	3.32	.72	.28	.18	.18	.49	.41	.....
23	2.85	1.17	.24	.17	.20	.58	.52	.....
24	2.09	.40	.22	.18	.20	.33	.52	.....
25	1.73	.30	.20	.18	.20	.33	.42	.....
26	1.73	.40	.20	.17	.22	.30	.42	.....
27	1.73	7.85	.20	.16	.61	.30	.42	.....
28	1.73	4.28	.18	.18	.53	.30	.42	.....
29	1.73	1.33	.22	.19	1.07	.29	.31	.....
30	1.73	1.10	.23	.19	.52	.29	.31	.....
31	.....	.90	.....	.20	.32	.....	.31	.....

Daily discharge, in second-feet, of Rose Creek at Dorrell, Sask., 1911–1914—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1913.								
1	.....	23.00	0.87	0.57	0.52	0.05	0.15	0.13
2	.....	16.90	1.07	.50	.75	.05	.08	.13
3	.....	22.00	.91	.44	.64	.05	.05	.11
4	.....	36.00	1.03	.40	1.78	.05	.05	.11
5	.....	37.00	3.40	.30	.75	.27	.05	.15
6	.....	27.00	.90	.29	.41	.15	.05	.31
7	.....	23.00	1.21	.27	.64	.08	.05	.31
8	.....	17.20	1.32	.24	.32	.11	.05	.26
9	.....	16.00	1.16	.21	.27	.23	.08	.24
10	.....	16.30	1.12	.18	.32	.27	.05	.21
11	.....	14.80	1.12	.21	.69	.15	.05	.21
12	.....	14.20	1.12	.32	.32	.08	.05	.21
13	.....	6.20	1.07	.70	.41	.05	.05	.19
14	.....	3.70	1.48	.27	.46	.32	.08	.17
15	.....	3.00	1.32	.18	.32	.27	.08	.19
16	.....	2.30	1.26	1.14	.23	.15	.08	.19
17	.....	1.12	1.21	.18	.15	.11	.08	.19
18	.....	.80	1.07	1.15	.15	.27	.08	.19
19	.....	1.07	1.12	.52	.15	.23	.15	.19
20	.....	1.16	1.07	5.67	.11	.15	.13	.21
21	.....	1.03	1.03	1.30	.11	.08	.09	.21
22	.....	.70	.94	1.46	.23	.08	.21	.21
23	.....	.57	.98	1.23	.15	.05	.47	.21
24	.....	.52	.94	1.62	.15	.05	.26	.19
25	.....	.52	.94	1.30	.11	.05	.21	.19
26	.....	.61	.90	1.30	.08	.05	.17	a.21
27	.....	.61	.90	1.46	.11	.05	.13	a.21
28	.....	.94	.83	1.01	.08	.05	.13	.24
29	.....	.94	.61	.75	.08	.05	.13	.24
30	.....	.73	.73	.64	.08	.08	.13	.24
31	.....	.....	.61	.....	.08	.23	.....	.21
1914.								
1	.....	10.30	.58	.36	.31	.01	.06	.18
2	.....	9.90	.52	.31	.23	.01	.06	.18
3	.....	6.90	.52	.41	.19	.01	.05	.22
4	.....	10.70	.58	.92	.15	.01	.05	.92
5	.....	11.80	1.08	1.38	.15	.00	.06	.58
6	.....	8.70	1.08	.92	.15	.01	.05	.92
7	.....	4.40	.75	.69	.15	.01	.05	1.01
8	.....	2.50	.75	.52	.15	.01	.06	1.62
9	.....	1.85	.69	.41	.12	.04	.08	1.38
10	.....	1.78	.69	.52	.12	.04	.06	1.01
11	.....	11.00	.63	.58	.10	.02	.06	.63
12	.....	9.10	.58	.75	.04	.02	.12	.58
13	7.30	2.60	.58	2.00	.03	.02	2.20	.58
14	13.00	3.30	.52	1.70	.03	.01	1.77	.52
15	4.50	2.40	.52	.92	.05	.01	1.01	.52
16	2.64	1.62	.52	.63	.05	.01	.63	.52
17	1.60	1.30	.63	.52	.04	.05	.52	.52
18	.63	1.15	.63	.41	.05	.08	.31	.47
19	.47	1.08	.69	.31	.02	.06	.31	.47
20	.41	1.01	.75	.31	.02	.04	.31	.47
21	.19	1.01	.75	.41	.03	.05	.27	.47
22	.27	1.01	.75	.41	.02	.04	.27	.47
23	.....	.87	.75	.31	.02	.06	.22	.47
24	.....	.98	1.01	.31	.02	.18	.22	.41
25	.....	.82	.69	.58	.02	.14	.22	.47
26	.....	.82	.58	.75	.02	.07	.22	.47
27	.....	.82	.52	.52	.02	.06	.22	.47
28	.....	.75	.52	.47	.00	.05	.22	.41
29	.....	.75	.41	.52	.01	.06	.22	.41
30	.....	.75	.41	.41	.00	.06	.18	.41
31	2.50	.....	.41	.....	.00	.06	.....	.41

a Interpolated.

NOTE.—1911: High water Sept. 5–6; gage not read but discharge was greater than the mean for the month.
1912: Apr. 3–7, ice present; data inadequate for determination of discharge. July 26 to Oct. 29, shifting control.
1913: Gage heights taken on 3-foot weir June 18 to Sept. 19. Crest of weir reduced from 3 feet to 15 inches Sept. 20.
1914: Channel frozen over Mar. 22–30. Crest of weir reduced from 36 inches to 6 inches July 9 to Sept. 12.

Monthly discharge of Rose Creek at Dorrell, Sask., 1911–1914.

[Drainage area, 13 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1911.						
May	1.13	0.45	0.69	0.053	0.061	42
June	1.38	.17	.53	.041	.046	32
July	.94	.02	.25	.019	.022	15
August	.49	.03	.10	.008	.009	6
September 1–4, 7–30	.96	.03	.37	.028	.029	21
October	.88	.31	.41	.032	.037	25
November 1–15	.37	.17	.29	.022	.012	9
The period					.216	150
1912.						
April 8–30	27.11	1.73	7.60	.585	.500	346.0
May	7.85	.30	1.21	.093	.11	74.0
June	5.71	.18	.70	.054	.06	42.0
July	.48	.16	.24	.018	.02	15.0
August	1.07	.17	.30	.023	.03	18.0
September	.67	.14	.34	.026	.03	20.0
October	.89	.26	.47	.036	.04	29.0
November 1–15	.48	.28	.33	.026	.02	10.0
The period					.810	554.0
1913.						
April	37.00	.52	9.480	.729	.813	564
May	3.40	.61	1.100	.085	.098	68
June	5.70	.14	.827	.064	.071	49
July	1.78	.08	.344	.026	.030	21
August	.32	.05	.126	.010	.012	8
September	.47	.05	.114	.009	.010	7
October	.31	.11	.209	.016	.018	13
The period					1.052	730
1914.						
March 13–31	13.00		1.76	.136	.100	66
April	11.80	.75	3.70	.287	.320	222
May	1.08	.41	.65	.050	.060	40
June	2.00	.31	.64	.049	.060	38
July	.31	.00	.07	.006	.007	5
August	.18	.00	.04	.003	.004	3
September	2.20	.05	.34	.026	.030	20
October	1.62	.18	.59	.045	.050	36
The period					.631	430

Mean monthly discharge, in second-feet, of Rose Creek at Dorrell, Sask., 1911–1914.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total in acre-feet.
1911	.....	.....	0.69	0.53	0.25	0.10	[a] 0.40	0.41	[b] 0.14	[c] 152
1912	.....	[a] 7.6	1.21	.70	.24	.30	.34	.47	[a] .33	670
1913	.....	9.5	1.10	.83	.34	.13	.11	.21	.....	730
1914	[b] 1.08	3.7	.65	.64	.07	.04	.34	.59	.....	430
Average	1.08	6.9	.91	.68	.22	.14	.30	.42	.24	610
Average run-off, acre-feet	66	411	56	40	14	9	18	26	14	654
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	50

[a] Average for part of month assumed as monthly average.
[b] Reduced to monthly average.
[c] Incomplete record not included in average.

MULE CREEK AT GUNN'S RANCH, SASK.

LOCATION.—In NE. ¼ sec. 33, T. 5, R. 17 W. third meridian, after June 16, 1916; prior to that date in SW. ¼ same section.

DRAINAGE AREA.—60 square miles.

RECORDS AVAILABLE.—Open-water flow (incomplete records) April 15, 1914, to November 8, 1916.

GAGE.—Vertical staff; observer, William Gunn, jr.

DISCHARGE MEASUREMENTS.—Made with current meter at high stages and with weir at low stages.

CHANNEL AND CONTROL.—Bed, gravel; clean. Right bank high, clean and subject to overflow during high water; left bank high and clean. One channel at all stages; does not shift. Control permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 8.50 feet, April 3, 1915 (discharge, 60 second-feet); minimum, 1.10 feet, May 10 and 11, 1914 (discharge, 0.01 second-foot).

ICE.—Station not maintained during winter.

ACCURACY.—Stage-discharge relation permanent during period of observations. Gage read once daily to hundredths. Records fair.

Discharge measurements of Mule Creek at Gunn's ranch, Sask., 1911–1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1911.		*Feet.*	*Sec.-ft.*	1915.		*Feet.*	*Sec.-ft.*
May 12	G. H. Whyte	0.910	0.870	May 20	F. R. Steinberger	0.11	0.24
June 10	do	.800	.570	26	do	1.84	6.50
Aug. 2	do	.820	[a] .736	June 29	do	.15	.38
Sept. 13	do	.950	[a] 1.063	July 30	do	.14	.34
13	do	1.055	3.660	Aug. 21	do	.06	.10
				Oct. 8	do	.16	.42
1912.							
July 5	J. S. Wright	.64	1.85	1916.			
Aug. 29	do	1.23	1.63	Apr. 27	J. E. Caughey	1.19	.55
Nov. 6	do	.....	[b] .79	May 17	do	1.59	1.77
				June 2	do	1.44	1.25
1914.				16	do	1.09	[a] .62
Apr. 15	E. W. W. Hughes	1.98	1.72	27	do	1.08	[a] .58
15	do	1.97	[a] 1.90	Aug. 4	L. B. P. Miles	1.08	[a] .21
May 14	do	1.29	[a] .27	18	do	1.02	[a] .19
July 21	do	1.21	[a] .06	Sept. 21	do	.94	[a] .18
Oct. 22	do	1.28	[a] .29	Nov. 11	do	1.05	[a] .31

[a] Weir measurements. [b] Gage destroyed.

Daily discharge, in second-feet, of Mule Creek at Gunn's ranch, Sask., 1914–1916.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1914.								
1	.....	.....	0.08	0.14	0.36	0.25	0.08	0.04
2	.....	.....	.17	.15	.36	.17	.10	.07
3	.....	.....	.08	.32	.25	.15	.09	1.77
4	.....	.....	.15	1.92	.29	.08	.12	2.40
5	.....	.....	.09	2.60	.32	.14	.08	2.50
6	.....	.....	.06	5.22	.25	.17	.04	3.00
7	.....	.....	.04	1.34	.25	.21	.05	2.40
8	.....	.....	.03	.60	.29	.12	.07	2.20
9	.....	.....	.02	.48	.27	.15	.08	2.00
10	.....	.....	.01	.97	1.34	.23	.06	1.84
11	.....	.....	.01	1.97	1.84	.19	.09	1.47
12	.....	.....	.02	5.70	1.10	.17	.07	1.32
13	.....	.....	.23	6.00	.48	.21	5.60	.82
14	.....	.....	.23	4.50	.36	.17	2.60	.60
15	.....	1.90	.19	1.84	.34	.19	.82	.72
16	.....	1.84	.21	1.10	.29	.14	.58	.43
17	.....	1.70	.14	.55	.36	.12	.70	.36
18	.....	1.24	.15	.36	.43	.19	.70	.25
19	.....	1.10	.12	.15	.34	.29	.58	.19
20	.....	1.07	.09	.36	.21	.21	.46	.14
21	.....	.77	.14	.43	.17	.17	.32	.09
22	.....	.55	.17	.15	.21	.12	.21	.21
23	.....	.48	.21	.08	.25	.10	.09	.27
24	.....	.55	.25	.10	.21	.10	.05	.25
25	.....	.32	.19	.15	.15	.12	.07	.25
26	.....	.25	.15	.60	.19	.09	.09	.19
27	.....	.32	.15	.55	.25	.07	.12	.23
28	.....	.08	.12	.43	.14	.09	.09	.15
29	.....	.15	.08	.36	.12	.05	.08	.17
30	.....	.21	.12	.21	.17	.10	.06	.29
31	.....	.....	.10	.....	.21	.12	.....	.25
1915.								
1	.....	35.00	.14	1.98	b 2.04	b .38	.06	.44
2	.....	a 40.00	.16	8.60	b 1.92	b .42	.04	b .77
3	.....	60.00	.17	5.80	b 2.05	b .27	.05	b .96
4	.....	44.00	.14	3.60	b 1.92	b .21	.04	b .81
5	.....	19.80	.16	b 1.62	b 1.80	3.90	.04	b 1.33
6	.....	10.40	.15	b 1.06	b 1.92	2.60	.04	2.74
7	.....	10.60	.14	b 1.33	b 2.24	3.20	.55	b 2.11
8	.....	10.20	.13	b 1.06	b 1.86	.17	.25	b .42
9	.....	9.40	.17	b .81	b 1.50	.06	.02	b .46
10	.....	8.40	.20	b .63	b 1.06	.04	.06	b .54
11	.....	8.60	.16	b .50	b .58	.03	.06	b 58
12	.....	7.60	.19	b .38	b .38	.02	.17	b .50
13	.....	2.10	.15	b .24	b .24	.04	.99	b .46
14	.....	1.65	3.30	b .42	b .27	.05	1.16	b .34
15	.....	1.24	4.00	b .58	b .38	.09	1.56	b .42
16	.....	.40	4.80	b .67	b .50	.06	1.13	b .50
17	.....	.12	2.70	b .72	b .63	.02	1.09	b .50
18	.....	.16	.72	b .58	b .96	.04	.99	b .38
19	.....	.19	.48	b 1.33	b .58	.05	.33	.33
20	a 4	.20	b .24	b .81	b 1.06	.05	.25	.28
21	6	.14	b .31	b .72	b 1.80	.09	.22	.25
22	8	.16	b 1.06	b .58	b 1.62	.15	.17	.31
23	7	.19	b 1.62	b .81	b .58	.17	.14	.28
24	8	.16	4.00	b .58	6.00	.12	.12	.22
25	10	.20	b 1.11	b 1.06	b .58	.08	.30	.20
26	12	.17	6.50	13.00	3.60	.05	.22	.17
27	14	.15	b .50	5.00	b .81	.04	.17	.22
28	16	.12	b .58	b 2.24	b .38	.02	.25	.25
29	18	.13	6.20	b 2.24	b 1.33	.03	.28	.28
30	24	.15	1.06	b 1.92	b .34	.04	.44	.20
31	20	.....	1.62	.....	b .27	.05	.....	.23

a Discharge estimated.

b Discharge determined by weir.

Daily discharge, in second-feet, of Mule Creek at Gunn's ranch, Sask., 1914–1916—Contd.

Day.	Aug.	Sept.	Oct.	Nov.	Day.	Aug.	Sept.	Oct.	Nov.
1916.					1916.				
1	a 0.40	0.22	0.60	0.48	16	0.40	0.25	0.40	.....
2	a .38	.24	4.20	.50	17	.37	.26	.37	.....
3	a .37	.28	9.80	.54	18	.28	.25	.36	.....
4	.37	.31	9.80	.52	19	.26	.24	.38	.....
5	.38	.24	12.30	.56	20	.23	.21	.42	.....
6	.42	.22	12.70	.52	21	.22	.19	.46	.....
7	.37	.23	4.20	.50	22	.24	.17	.44	.....
8	.40	.25	2.90	.60	23	.26	.19	.48	.....
9	20.00	.24	1.85	.....	24	.31	.21	.42	.....
10	8.70	.26	1.28	.....	25	.36	.23	.40	.....
11	3.20	.30	.72	.....	26	.34	.25	.37	.....
12	1.85	.26	.54	.....	27	.31	.32	.34	.....
13	.96	.24	.46	.....	28	.30	.38	.38	.....
14	.50	.22	.42	.....	29	.26	.50	.42	.....
15	.44	.23	.44	.....	30	.23	.72	.46	.....
					31	.22	.....	.48	.....

a Estimated.

Monthly discharge of Mule Creek at Gunn's ranch, Sask., 1914–1916.

[Drainage area, 60 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1914.						
April 15–30	1.90	0.08	0.78	0.013	0.001	25
May	.25	.01	.12	.002	.002	8
June	6.00	.08	1.31	.022	.024	78
July	1.84	.12	.38	.006	.007	23
August	.29	.05	.15	.002	.003	9
September	5.60	.04	.47	.008	.009	28
October	3.00	.04	.87	.014	.016	53
The period	.....	.....	.....	.....	.062	224
1915.						
March 20–31	24.00	4.00	12.20	.203	.09	290
April	60.00	.12	9.10	.152	.18	541
May	6.50	.13	1.39	.023	.03	85
June	13.00	.24	2.00	.033	.04	119
July	6.00	.24	1.32	.022	.02	81
August	3.90	.02	.40	.007	.01	25
September	1.56	.02	.37	.006	.01	22
October	2.70	.17	.56	.009	.01	34
The period	.....	.....	.....	.....	.39	1,197
1916.						
August	20.00	.22	1.40	.023	.03	86
September	.72	.17	.27	.004	.00	16
October	12.70	.34	2.20	.037	.04	135
November 1–8	.60	.48	.53	.009	.00	8
The period	.....	.....	.....	.....	.07	245

NOTE.—Daily records, Apr. 27 to July 31, 1916, unreliable, not published.

Mean monthly discharge, in second-feet, of Mule Creek at Gunn's ranch, Sask., 1914–1916.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total in acre-feet.
1914	.....	a 0.78	0.12	1.31	0.38	0.15	0.47	0.87	.....	a 224
1915	b 4.7	9.10	1.39	2.00	1.32	.40	.37	.56	.....	1,197
1916	.....	.....	.....	.....	.....	1.40	.27	2.20	a 0.53	a 245
Average	4.7	9.1	.76	1.66	.85	.65	.37	1.21	.....	1,197
Average run-off, acre-feet	289	542	47	99	52	40	22	74	.....	1,165
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	19

a Incomplete record not included in average. b Reduced to monthly average.

BATE CREEK AT BATE'S RANCH, SASK.

LOCATION.—In SW. ¼ sec. 7, T. 6, R. 16 W. third meridian, during 1916; in NW. ¼ sec. 6, T. 6, R. 16 W. third meridian, during 1914–15; both sites near Nummola, Sask.

DRAINAGE AREA.—12 square miles.

RECORDS AVAILABLE.—Open-water flow April 13, 1914, to October 31, 1916, when station was discontinued.

GAGE.—Vertical staff fastened to post on right bank about one-quarter mile from Mr. Bate's house.

DISCHARGE MEASUREMENTS.—Made with current meter or weir.

CHANNEL AND CONTROL.—Bed gravel and sand; clean. Banks high and not subject to overflow. One channel at all stages. Control not permanent in high stages.

EXTREMES OF DISCHARGE.—1914–1916: Maximum stage recorded, 3.55 feet July 3, 1916 (discharge, 119 second-feet); no flow July 16 to August 17, 1914.

DIVERSION.—A. E. Bate diverts water for irrigation above the gage.

ACCURACY.—Stage-discharge relation not permanent for high stages. Gage read daily to hundredths. Records fair.

Discharge measurements of Bate Creek at Bate's ranch, Sask., 1914–1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*	1915.		*Feet.*	*Sec.-ft.*
Apr. 16	E. W. W. Hughes	1.71	1.23	Aug. 25	F. R. Steinberger	0.120	0.273
May 14	do	1.49	.34	Sept. 14	do	.150	.381
July 21	do	1.20	.....	16	do	.150	.381
Oct. 23	do	1.42	.15	Oct. 4	do	.140	.341
1915.				6	do	.140	.341
May 11	F. R. Steinberger	1.270	.277	7	do	.150	.381
20	do	.115	.255	1916.			
26	do	.270	.908	Apr. 26	J. E. Caughey	1.50	.42
31	do	.135	.327	May 17	do	1.54	.62
June 25	do	.115	.255	June 2	do	1.55	.71
26	do	.190	.539	17	do	[a] 1.51	.53
29	do	.120	.273	27	do	[a] 1.37	.29
July 27	do	.140	.344	Aug. 5	L. B. P. Miles	[b] .25	.27
28	do	.120	.273	5	do	[c] .60	.27
30	do	.120	.273	18	do	.54	.10
Aug. 21	do	.100	.209	Sept. 21	do	.65	.18
23	do	.090	.176	Nov. 11	do	.55	.07

[a] Gage height affected by backwater from vegetation.
[b] Gage height affected by scour from flood of July 2.
[c] Staff gage reestablished at new section.

NOTE.—All measurements in 1915 and 1916 made with 24-inch weir.

Daily discharge, in second-feet, of Bate Creek at Bate's ranch, Sask., 1914–1916.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1914.								
1	.....	.....	0.83	0.11	0.08	0.02	0.07	0.13
2	.....	.....	.78	.15	.08	.02	.05	.15
3	.....	.....	.60	.25	.04	.0	.04	.15
4	.....	.....	.49	.67	.03	.0	.05	.25
5	.....	.....	.45	.52	.05	.0	.05	.22
6	.....	.....	.42	.35	.05	.0	.04	.22
7	.....	.....	.38	.38	.08	.0	.05	.38
8	.....	.....	.28	.15	.03	.0	.10	.56
9	.....	.....	.32	.13	.05	.01	.11	.25
10	.....	.....	.32	.15	.05	.01	.07	.25
11	.....	.....	.25	.18	.05	.0	.05	.20
12	.....	.....	.22	.52	.02	.0	.08	.15
13	.....	.....	.15	1.28	.02	.0	1.92	.15
14	.....	.....	.32	.60	.01	.0	.56	.15
15	.....	2.37	.28	.32	.02	.0	.20	.15
16	.....	1.53	.38	.25	.0	.0	.15	.15
17	.....	1.28	.38	.20	.0	.0	.11	.15
18	.....	1.42	.32	.15	.0	.02	.10	.15
19	.....	1.70	.32	.11	.0	.01	.11	.15
20	.....	1.59	.32	.11	.0	.02	.11	.15
21	.....	1 28	.32	.20	.0	.02	.11	.15
22	.....	1.32	.32	.13	.0	.01	11	.15
23	.....	1.37	.32	.11	.0	.02	.11	.15
24	.....	1.32	.38	.08	.0	.70	.11	.18
25	.....	1.09	.28	.25	.0	.13	.11	.18
26	.....	1.05	.25	.22	.0	.05	.11	.20
27	.....	1.00	.20	.18	.0	.04	.11	.18
28	.....	.96	.22	.11	.0	.07	.11	.18
29	.....	.96	.20	.22	.0	.04	.11	.20
30	.....	.96	.18	.15	.0	05	.11	.18
31	.....	.....	.15	.....	.0	.08	.....	.20
1915.								
1	.....	1.59	.25	.42	.34	.15	.15	.31
2	.....	4.70	.25	.81	.21	.18	.27	.34
3	.....	3.40	.25	.50	.27	.21	.21	.67
4	.....	1.47	.25	.34	.27	.15	.21	.34
5	.....	1.44	.24	.42	.21	.10	.21	.34
6	.....	.89	.24	.34	.34	.10	.15	.34
7	.....	.69	.24	.31	.27	.10	.24	.34
8	.....	.79	.22	.34	.21	.07	.21	.34
9	.....	.79	.22	.27	.27	.10	.21	.27
10	.....	.65	.22	.34	.27	.07	.24	.34
11	.....	.65	.25	.27	.21	.07	.27	.34
12	.....	.58	.26	.24	.15	.10	.34	.27
13	.....	.74	.31	.21	.21	.07	.34	.24
14	.....	.84	.84	.21	.42	.07	.27	.21
15	.....	.45	.54	.24	.27	.10	.21	.27
16	.....	.48	.40	.34	.21	.05	.21	.24
17	.....	.43	.32	.34	.72	.10	.21	.27
18	.....	.34	.31	.24	.50	.10	.21	.27
19	.....	.35	.25	.54	.34	.27	.27	.24
20	.....	.35	.26	.42	.24	.15	.27	.27
21	.....	.30	[a].27	.27	.21	.15	.27	.27
22	.....	.28	.24	.21	.15	.15	.27	.24
23	4.90	.27	.27	.21	.34	.18	.21	.27
24	3.60	.28	.27	.18	.27	.12	.24	.24
25	3.20	.27	.38	.15	.24	.15	.21	.27
26	2.40	.26	.86	1.06	.27	.12	.21	.24
27	2.10	.26	.50	.27	.21	.15	.27	.24
28	2.10	.25	.27	.27	.21	.15	.27	.21
29	1.80	.25	.42	.24	.42	.10	.27	.27
30	1.56	.25	.34	31	.21	.15	.27	.24
31	1.27	.....	.27	.....	.21	.15	.....	.27

[a] New weir gage rod from May 21.

Daily discharge, in second-feet, of Bate Creek at Bate's ranch, Sask., 1914–1916—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1916.								
1	.....	2.90	0.38	0.80	0.18	0.26	0.08	0.41
2	.....	1.36	.46	.53	46.00	.26	.06	.51
3	.....	.88	.42	.42	[a]119.00	.26	.08	.58
4	.....	1.04	.56	.56	2.10	.26	.20	.62
5	.....	1.40	.46	2.50	1.16	[b].14	.14	.62
6	.....	1.32	.46	.77	3.00	.14	.14	.82
7	.....	1.48	.38	.46	.84	.11	.13	.66
8	.....	1.90	.36	.46	.48	.13	.13	.58
9	.....	1.28	.38	.53	.53	.25	.25	.58
10	[a]20.00	1.60	.50	1.80	.42	.22	.25	.51
11	[a]70.00	1.65	.46	.65	.40	.22	.14	.51
12	[a]20.00	2.00	.50	.46	.36	.22	.14	.51
13	5.10	1.90	.50	.46	.36	.16	.27	.48
14	.27	1.44	.48	.46	.36	.14	.14	.44
15	.02	1.36	.68	.42	.36	.11	.25	.44
16	.01	1.28	1.32	.38	.34	.11	.27	.44
17	.02	1.04	.62	.48	.32	.07	.27	.48
18	.04	1.04	.50	.30	2.90	.05	.27	.58
19	.20	1.04	.46	.28	.36	.04	.27	.48
20	2.40	.74	.46	.27	.28	.06	.25	.51
21	118.00	.65	.50	.42	.26	.06	.27	.55
22	.59	.62	.48	2.70	.26	.06	.29	.48
23	.14	.56	.56	.68	.26	.06	.27	.44
24	.10	.50	.50	.48	.28	.07	.29	.48
25	.30	.53	6.40	.27	.28	.13	.32	.48
26	4.40	.50	4.40	.21	.28	.11	.32	.48
27	9.30	.38	1.16	.27	.42	.08	.66	.55
28	10.80	.38	1.16	.28	.28	.07	.44	.48
29	8.00	.46	1.12	1.40	.46	.06	.44	.44
30	9.00	.42	1.36	.65	.30	.06	.38	.44
31	7.70	.....	.88	.....	.28	.08	.....	.44

[a] Estimated. [b] Staff gage reestablished at new section.

NOTE.—1914: No flow July 16, July 18–31, Aug. 3–8, and Aug. 11–17.
1916: Stage-discharge relation affected by ice Mar. 10–12; discharge estimated.

Monthly discharge of Bate Creek at Bate's ranch, Sask., 1914–1916.

[Drainage area, 12 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1914.						
April 15–30	2.40	0.96	1.32	0.110	0.065	42
May	.83	.15	.34	.029	.033	21
June	1.28	.11	.27	.023	.026	16
July	.08	.00	.02	.002	.002	1
August	.70	.00	.04	.004	.005	3
September	1.92	.04	.17	.014	.016	10
October	.56	.13	.20	.016	.018	12
The period	.....	.....	.....	.....	.165	105
1915.						
March 23–31	4.90	1.27	2.55	.212	.07	46
April	4.70	.25	.81	.068	.08	48
May	.86	.22	.33	.028	.03	48
June	1.06	.15	.34	.029	.03	20
July	.72	.15	.28	.023	.03	17
August	.27	.05	.12	.010	.01	7
September	.34	.15	.24	.020	.02	14
October	.67	.21	.29	.024	.03	18
The period	.....	.....	.....	.....	.30	190

Monthly discharge of Bate Creek at Bate's ranch, Sask., 1914–1916—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1916.						
March 10–31	118.00	0.01	13.00	1.080	0.88	567
April	2.90	.38	1.12	.093	.10	67
May	6.40	.36	.93	.078	.09	57
June	2.70	.21	.68	.057	.06	40
July	119.00	.18	5.90	.492	.57	363
August	.26	.04	.13	.011	.01	8
September	.66	.06	.25	.021	.02	15
October	.82	.41	.52	.043	.05	32
The period	.....	.....	.....	.....	1.78	1,149

NOTE.—Small flow continued during first part of November, 1916.

Mean monthly discharge, in second-feet, of Bate Creek at Bate's ranch, Sask., 1914–1916.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Total in acre-feet.
1914	.....	[a] 1.32	0.34	0.27	0.02	0.04	0.17	0.20	[a] 105
1915	[a] 2.6	.81	.33	.34	.28	.12	.24	.29	190
1916	[b] 9.2	1.12	.93	.68	5.90	.13	.25	.52	1,149
Average	[c] 2.3	.96	.53	.43	2.07	.10	.22	.34	670
Average run-off, acre-feet	141	57	33	26	127	6	13	21	424
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	35

[a] Incomplete record not included in average.
[b] Reduced to monthly average.
[c] Discharge for March, 1916, averaged for 4 years as conditions were abnormal.

NOTE.—Small quantities of water diverted by A. E. Bate not included in these records.

DENNIEL CREEK NEAR VAL MARIE, SASK.[1]

LOCATION.—In SW. ¼ sec. 16, T. 4, R. 13 W. third meridian, about half a mile east of Val Marie, Sask.

DRAINAGE AREA.—182 square miles.

RECORDS AVAILABLE.—Open-water flow (incomplete records) April 7, 1914, to October 31, 1917.

GAGE.—Vertical staff; read by Jean Denniel.

DISCHARGE MEASUREMENTS.—Made from cable, by wading, or with weir.

CHANNEL AND CONTROL.—Bed of channel stony; permanent. Right bank high and steep; left bank low; neither bank subject to overflow. Control may shift.

EXTREMES OF DISCHARGE.—1914–1917: Maximum stage recorded 10.16 feet April 11 and 12, 1917 (discharge estimated at 341 second-feet); no flow July 17 to August 23, 1914, and for part of April and August, 1917.

ICE.—Stage-discharge relation affected by ice during spring run-off.

ACCURACY.—Stage-discharge relation permanent. Gage read daily to hundredths throughout open-water season. Discharge obtained by applying gage heights to rating table. Records poor.

[1] Formerly called Snake Creek near Val Marie.

Discharge measurements of Denniel Creek near Val Marie, Sask., 1914–1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*	1915		*Feet.*	*Sec.-ft.*
Apr. 7	E. W. W. Hughes	3.05	40.00	Sept. 10	F. R. Stienberger	0.53	[a] 0.28
19	do	1.81	1.35	19	do	.65	[a] .25
May 11	do	1.14	[a] .32	29	do	.64	[a] .28
18	do	1.04	[a] .20	Oct. 12	do	.64	[a] .30
June 20	do	[b] .52	[a] .24				
21	do	.59	[a] .35	1916.			
22	do	.60	[a] .33	Apr. 24	J. E. Caughey	2.25	11.80
23	do	.58	[a] .31	May 18	do	.97	2.40
24	do	.52	[a] .22	31	do	2.54	21.00
July 11	do	.43	[a] .05	June 19	do	1.35	2.90
24	do	.34	0	26	do	1.95	6.90
Oct. 24	do	.54	[a] .26	Aug. 7	L. B. P. Miles	1.00	[a] 1.12
				15	do	.92	.90
1915.				Sept. 9	do	.76	.46
May 7	F. R. Steinberger	.59	[a] .39	16	do	.74	.45
22	do	.60	[a] .39	Nov. 14	do	.66	.42
June 4	do	.89	1.18				
21	do	.70	[a] .50	1917.			
July 7	do	.60	[a] .35	May 28	P. A. Fetterly	.90	1.94
24	do	.63	[a] .28	July 8	do	.56	.36
Aug. 2	do	.60	[a] .36	Aug. 13	do	.46	.10
17	do	.45	[a] .09	Oct. 11	do	.58	.29
28	do	.42	[a] .05	Nov. 26	do	.58	.41

[a] Discharge determined by using a 24-inch weir.
[b] Station moved up stream about 1 mile.

Daily discharge, in second-feet, of Denniel Creek near Val Marie, Sask., 1914–1917.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1914.								
1			0.40		0.26	0	0.04	0.24
2			.34		.19	0	.03	.22
3			.34		.17	0	.02	.22
4			.31		.15	0	.02	.30
5			.30		.15	0	.01	.39
6			.28		.12	0	.01	.42
7		40.00	.40		.08	0	.01	.44
8		29.00	.46		.04	0	.02	.45
9		60.00	.38		.04	0	.08	.48
10		146.00	.34		.04	0	.08	.46
11		158.00	.31		.10	0	.07	.46
12		107.00			.07	0	.07	.46
13		42.00			.04	0	.39	.39
14		6.70			.02	0	.49	.31
15		17.10			.01	0	.46	.30
16		57.00			.01	0	.42	.30
17		23.00			0	0	.35	.30
18		5.20			0	0	.33	.31
19		1.58			0	0	.31	.35
20		1.18		[a] .21	0	0	.33	.37
21		1.09		.28	0	0	.31	.21
22		1.02		.35	0	0	.33	.24
23		.97		.31	0	0	.30	.21
24		.56		.21	0	.02	.30	.24
25		.56		.35	0	.08	.26	.24
26		.49		.39	0	.03	.24	.24
27		.44		.48	0	.02	.24	.21
28		.54		.35	0	.02	.22	.26
29		.49		.35	0	.02	.22	.26
30		.49		.30	0	.02	.24	.24
31					0	.06		.26

[a] Station moved about 1 mile upstream.

Daily discharge, in second-feet, of Denniel Creek near Val Marie, Sask., 1914–1917—Con.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1915.								
1	.....	94.00	0.37	1.20	0.40	0.32	0.11	0.29
2	.....	155.00	.39	1.17	.41	.36	.13	.30
3	.....	194.00	.37	1.14	.41	.32	.14	.39
4	.....	135.00	.38	1.18	.42	.32	.15	.39
5	.....	84.00	.39	.95	.38	.29	.16	.38
6	.....	59.00	.40	.64	.36	.26	.17	.35
7	.....	43.00	.39	.55	.35	.24	.20	.33
8	.....	22.00	.39	.57	.38	.24	.25	.30
9	.....	9.40	.38	.54	.36	.22	.27	.30
10	.....	5.50	.38	.49	.34	.20	.28	.30
11	.....	3.70	.38	.44	.32	.18	.29	.30
12	.....	2.60	.38	.43	.31	.15	.31	.30
13	.....	1.62	.39	.42	.28	.15	.33	.29
14	.....	1.26	.42	.45	.25	.13	.34	.29
15	.....	1.20	.45	.42	.28	.12	.32	.28
16	.....	.87	.51	.38	.29	.11	.29	.28
17	.....	.82	.48	.45	.30	.09	.28	.29
18	.....	.75	.46	.41	.48	.10	.26	.29
19	.....	.68	.42	.41	.46	.11	.25	.30
20	.....	.55	.39	.44	.42	.12	.24	.29
21	.....	.55	.37	.51	.39	.11	.23	.30
22	2.8	.54	.39	.52	.35	.11	.22	.28
23	3.1	.55	.38	.57	.29	.10	.23	.26
24	60.0	.55	.36	.58	.28	.10	.22	.26
25	67.0	.51	.36	.48	.29	.09	.21	.25
26	54.0	.48	.55	.44	.28	.09	.22	.24
27	53.0	.45	.68	.45	.28	.09	.23	.24
28	54.0	.43	.68	.46	.27	.05	.28	.23
29	36.0	.41	.60	.45	.28	.08	.28	.22
30	50.0	.41	1.30	.44	.31	.09	.29	.23
31	90.0	.....	1.26	.....	.30	.10	.....	.25
1916.								
1	.....	300.0	3.40	20.0	82.00	15.30	.52	.87
2	.....	273.0	3.00	12.4	54.00	10.00	.54	.87
3	.....	273.0	2.50	7.9	215.00	5.40	.54	.90
4	.....	216.0	2.20	6.6	173.00	4.50	.58	.90
5	.....	163.0	1.82	5.6	80.00	2.70	.60	.90
6	.....	110.0	1.66	5.6	70.00	1.82	.58	1.00
7	.....	102.0	1.47	4.6	81.00	1.51	.60	1.00
8	.....	146.0	1.26	5.4	54.00	1.23	.57	.98
9	.....	156.0	1.14	6.4	223.00	1.26	.52	.95
10	.....	196.0	.98	7.6	111.00	1.26	.68	.95
11	.....	188.0	.90	9.3	60.00	1.14	.64	.77
12	.....	192.0	.80	27.0	38.00	1.08	.60	.64
13	.....	148.0	.75	15.9	32.00	1.08	.54	.58
14	.....	144.0	.70	8.2	15.00	.98	.52	.57
15	.....	136.0	.70	6.0	11.10	1.00	.55	.54
16	.....	116.0	1.05	4.7	7.70	.87	.58	.52
17	.....	76.0	1.00	3.8	4.80	.77	.58	.52
18	.....	64.0	1.14	3.5	7.40	.66	.60	.52
19	.....	58.0	1.03	2.5	7.40	.58	.64	.52
20	.....	49.0	.90	2.0	5.50	.54	.68	.52
21	.....	36.0	.82	2.0	4.70	.52	.64	.51
22	.....	10.3	.75	2.7	3.50	.60	.58	.51
23	.....	18.0	.70	2.8	2.90	.52	.58	.51
24	.....	11.9	.66	4.8	2.00	.52	.60	.49
25	.....	7.6	2.20	8.0	1.66	.52	.66	.48
26	50	5.6	85.00	7.5	1.54	.54	.70	.48
27	100	4.4	78.00	4.8	1.47	.52	.77	.48
28	100	4.0	61.00	5.0	1.26	.51	.80	.46
29	200	3.8	35.00	4.3	1.51	.48	.82	.46
30	300	3.8	25.00	142.0	5.20	.49	.85	.45
31	300	.....	21.00	.....	4.50	.49	.....	.45

Daily discharge, in second-feet, of Denniel Creek near Val Marie, Sask., 1914–1917—Con.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1917.								
1			81.00	0.94	0.38	0	0.14	0.38
2			77.00	.90	.36	0	.22	.40
3			76.00	.94	.36	0	.30	.40
4		2	81.00	.94	.40	0.02	.30	.40
5		6	78.00	.98	.38	.06	.32	.38
6		8	68.00	1.03	.38	.08	.32	.38
7		15	62.00	1.08	.32	.10	.30	.38
8		100	56.00	1.69	.32	.12	.32	.36
9		125	47.00	1.62	.32	.14	.32	.36
10		300	36.00	1.76	.30	.12	.34	.36
11		341	20.00	1.95	.30	.12	.34	.44
12		341	16.70	2.60	.30	.10	.34	.38
13		320	13.60	4.50	.30	0	.38	.38
14		299	10.80	6.70	.30	0	.44	.40
15		173	11.30	5.30	.28	0	.76	.49
16		141	9.90	4.30	.28	0	.90	.58
17		89	8.70	3.30	.24	0	.90	.54
18		81	7.60	3.00	.22	0	.76	.54
19		57	6.40	2.60	.20	.02	.54	.54
20		141	4.70	2.30	.16	.02	.44	.58
21		173	4.50	2.00	.16	0	.38	.49
22		173	4.50	1.76	.14	.02	.36	.44
23		162	4.20	1.43	.14	.04	.38	.49
24		152	4.20	1.08	.08	.02	.38	.44
25		132	4.10	.94	.04	0	.40	.44
26		123	3.30	.85	.04	0	.40	.40
27		118	2.50	.49	.06	0	.38	.40
28		97	1.69	.32	.06	0	.40	.40
29		85	1.03	.36	.04	0	.40	.40
30		81	1.03	.36	.02	0	.38	.40
31			.98		.02	.06		.44

NOTE.—1914: No observer May 12 to June 19. No flow July 17 to Aug. 23.
1915: Control shifting May 23 to Oct. 31.
1916: Stage-discharge relation affected by ice Mar. 26 to Apr. 5; discharge estimated. Ice going out Apr. 3–5.
1917: Stage-discharge relation affected by ice Apr. 1–10. Determinations of discharge above 40 second-feet roughly approximate. No flow Aug. 1–3, 13–18, 21, and 25–30.

Monthly discharge of Denniel Creek near Val Marie, Sask., 1914–1917.

[Drainage area, 188 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1914.						
April 7–30	158.00	0.44	29.10	0.15000	0.01300	1,388
May 1–11	.46	.28	.35	.00200	.00080	8
June 20–30	.48	.21	.32	.00200	.00070	7
July	.26	0	.05	.00020	.00030	3
August	.08	0	.01	.00005	.00006	1
September	.49	.01	.21	.00100	.00100	12
October	.48	.21	.32	.00200	.00200	19
The period					.01786	1,438
1915.						
March 22–31	90.00	2.80	47.00	.250	.090	932
April	194.00	.41	27.00	.144	.160	1,607
May	1.30	.36	.49	.003	.004	30
June	1.20	.38	.59	.003	.003	35
July	.48	.25	.34	.002	.002	21
August	.36	.05	.16	.001	.001	10
September	.34	.11	.24	.001	.001	14
October	.39	.22	.29	.002	.002	18
The period					.26	2,667

Monthly discharge of Denniel Creek near Val Marie, Sask., 1914–1917—Continued.

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1916.						
March 26–31	300.00	50.00	175.00	0.931	0.210	2,082
April	300.00	3.80	107.00	.569	.630	6,367
May	85.00	.70	10.90	.058	.070	670
June	142.00	2.00	11.60	.062	.070	690
July	223.00	1.26	44.00	.234	.270	2,705
August	15.30	.48	1.90	.010	.010	117
September	.85	.52	.62	.003	.003	37
October	1.00	.45	.64	.003	.003	39
The period					1.266	12,707
1917.						
April	341.00	0	128.00	.703	.780	7,617
May	81.00	.98	26.00	.143	.160	1,599
June	6.70	.32	1.93	.011	.012	115
July	.40	.02	.22	.001	.001	14
August	.14	0	.03	0	0	2
September	.90	.14	.42	.002	.002	25
October	.58	.36	.43	.002	.002	26
The period					.96	9,398

NOTE.—Determinations of discharge roughly approximate from Apr. 4 to May 10, 1917. Area used in computing these tables is the same as published in the Canadian hydrometric reports, which was changed from time to time as more definite information of the drainage basin was obtained.

Mean monthly discharge, in second-feet, of Denniel Creek near Val Marie, Sask., 1914–1917.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Total in acre-feet.
1914	.....	[a] 29.0	[b] 0.35	[b] 0.32	0.05	0.01	0.21	0.32	[b] 1,776
1915	[c] 15.2	27.0	.49	.59	.44	.37	.28	.44	2,692
1916	[c] 34.0	107.0	10.90	11.60	44.00	1.90	.62	.64	12,707
1917	.....	128.0	26.00	1.93	.22	.03	.42	.43	9,398
Average	[c] 25	73	12.5	4.7	11.2	.56	.40	.46	8,257
Average run-off, acre-feet	1,537	4,344	769	280	689	34	24	28	7,699
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	42

[a] Average for part of month assumed as monthly average. [b] Incomplete record not included in average.
[c] Estimated.

BIGBREED CREEK NEAR BUZZARD'S RANCH, SASK.

LOCATION.—In NW. ¼ sec. 3, T. 2, R. 11 W. third meridian, about 300 feet from the junction with Frenchman River, from April 20, 1915, to end of 1916; during 1914 and to April 20, 1915, in SE. ¼ sec. 15, T. 2, R. 11 W. third meridian.

DRAINAGE AREA.—83 square miles.

RECORDS AVAILABLE.—Open-water flow (incomplete records) from March 30, 1914, to June 20, 1916, when station was abandoned because of difficulty in obtaining observer.

GAGE.—Vertical staff.

DISCHARGE MEASUREMENTS.—Made by wading or by weir.

CHANNEL AND CONTROL.—Bed of stream partly covered with vegetation likely to affect stage-discharge relation during high water. Right bank high and wooded; left bank wooded, and may be overflowed at high stages. One channel at all stages. Control shifting.

EXTREMES OF DISCHARGE.—1914–1916: Maximum stage recorded, 8.76 feet, March 28, 1916 (discharge, 363 second-feet); no flow during periods of each year.

ICE.—Station not maintained during winter.

ACCURACY.—Stage-discharge relation not permanent; affected by backwater from Frenchman River at high stages and by beaver dams.

Discharge measurements of Bigbreed Creek near Buzzard's ranch, Sask., 1914–1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Apr. 1..	E. W. W. Hughes.....	3.19	40.00	Apr. 20..	F. R. Steinberger.....	1.01	[a]0.431
2..	.....do.....	2.45	35.00	28..	.....do.....	.67	[a]0.974
26..	.....do.....	.98	[a].87	June 7..	.....do.....	1.71	5.70
May 4..	.....do.....	.89	[a].31	8..	.....do.....	1.55	3.90
21..	.....do.....	.85	[a].06	16..	.....do.....	.93	[a].459
June 10..	.....do.....	.34	0	July 10..	.....do.....	0	0
13..	.....do.....	1.08	3.90	21..	.....do.....	.70	[a].146
July 3..	.....do.....	.60	0	Aug. 4..	.....do.....	Dry.	0
28..	.....do.....	.....	0	13..	.....do.....	Dry.	0
Oct. 26..	.....do.....	.....	0	31..	.....do.....	Dry.	0
				Sept. 8..	.....do.....	Dry.	0
1915.				21..	.....do.....	Dry.	0
Mar. 23..	F. R. Steinberger.....	.97	.67	Oct. 14..	.....do.....	Dry.	0
25..	.....do.....	3.37	63.00				
26..	.....do.....	3.07	48.00	1916.			
29..	.....do.....	2.23	30.00	Apr. 7..	J. E. Caughey.....	2.85	72.00
30..	.....do.....	2.12	26.00	17..	.....do.....	2.68	65.00
31..	.....do.....	1.91	24.00	21..	.....do.....	1.81	27.00
Apr. 1..	.....do.....	2.05	28.00	May 20..	.....do.....	1.17	3.70
2..	.....do.....	3.42	74.00	29..	.....do.....	1.56	18.20
5..	.....do.....	2.62	48.00	June 20..	.....do.....	1.04	2.30
6..	.....do.....	2.12	31.00	Aug. 14..	L. B. P. Miles.....	.78	[a].29
7..	.....do.....	1.83	18.00	Sept. 10..	.....do.....	.27	[a].04
8..	.....do.....	1.63	8.80	12..	.....do.....	.25	[a].03
9..	.....do.....	1.49	7.40	16..	.....do.....	.21	[a].04
10..	.....do.....	1.63	5.00	Nov. 18[b]..	.....do.....	.58	[a].20
12..	.....do.....	1.32	2.60				

[a] Discharge determined by using a 24-inch weir. [b] Stream frozen over.

Daily discharge, in second-feet, of Bigbreed Creek near Buzzard's ranch, Sask., 1914–1916.

Day.	Mar.	Apr.	May.	June.	Day.	Mar.	Apr.	May.	June.
1914.					1915.				
1	.....	40.00	0.26	0	1	.....	27.00	0.07	3.40
2	.....	36.00	.26	0	2	.....	73.00	.04	3.40
3	.....	35.00	.64	0	3	.....	130.00	0	[a]3.86
4	.....	33.00	.64	0	4	.....	110.00	0	[a]4.32
5	.....	33.00	.50	0	5	.....	47.00	0	[a]4.78
6	.....	33.00	.50	0	6	.....	31.00	.04	[a]5.24
7	.....	33.00	.50	0	7	.....	18.00	0	5.70
8	.....	25.00	.42	0	8	.....	8.80	0	[a]3.90
9	.....	14.80	.42	0	9	.....	[a]7.40	0	3.47
10	.....	12.60	.34	0	10	.....	5.00	0	3.04
11	.....	6.40	2.80	0	11	.....	[a]3.80	0	2.61
12	.....	43.00	2.30	0	12	.....	2.60	0	2.18
13	.....	43.00	.34	4.50	13	.....	1.905	0	1.75
14	.....	63.00	.34	5.80	14	.....	1.30	.07	1.32
15	.....	17.10	.42	3.00	15	.....	.85	.50	[a].89
16	.....	13.00	.42	10.40	16	.....	1.30	7.30	.46
17	.....	13.00	.08	6.10	17	.....	1.30	9.30	.....
18	.....	6.40	.05	2.10	18	.....	1.90	8.30	.....
19	.....	3.20	.08	1.20	19	.....	.90	5.30	.....
20	.....	3.80	.05	.92	20	.....	.43	.50	.....
21	.....	2.50	.03	.64	21	.....	.42	.30	.....
22	.....	1.06	.04	5.10	22	.....	.42	.15	.....
23	.....	.78	.03	.10	23	0.67	.42	.00	.....
24	.....	.64	0	.03	24	[a]32.00	.12	0	.....
25	.....	1.06	0	.08	25	63.00	.12	0	.....
26	.....	.92	0	.78	26	48.00	.12	0	.....
27	.....	.42	0	3.00	27	[a]42.00	[a].10	0	.....
28	.....	.50	0	3.80	28	[a]36.00	.07	0	.....
29	.....	.42	0	3.20	29	30.00	.07	0	.....
30	25	.34	0	.10	30	26.00	.07	0	.....
31	32	.....	0	.....	31	23.80	.....	0	.....

[a] Estimated.

Daily discharge, in second-feet, of Bigbreed Creek near Buzzard's ranch, Sask., 1914–1916—Continued.

Day.	Mar.	Apr.	May.	June.	Day.	Mar.	Apr.	May.	June.
1916.									
1	.....	a 309	a 15.0	a 26.0	16	.....	a 195	a 3.9	a 4.0
2	.....	a 252	a 14.0	a 25.0	17	.....	65	a 3.8	a 2.8
3	.....	a 205	a 13.0	a 24.0	18	.....	a 57	a 3.7	a 2.4
4	.....	a 155	a 12.0	a 24.0	19	.....	a 47	a 3.7	a 2.3
5	.....	a 99	a 11.0	a 24.0	20	.....	a 37	3.7	2.3
6	.....	80	a 10.0	a 25.0	21	.....	27	5.0	.....
7	.....	72	a 9.0	a 27.0	22	10	23	5.0	.....
8	.....	a 90	a 8.0	a 30.0	23	a 30	a 23	5.0	.....
9	.....	a 122	a 7.0	a 27.0	24	a 45	a 22	5.0	.....
10	.....	a 265	a 6.0	a 25.0	25	a 50	a 21	a 136.0	.....
11	.....	a 285	a 5.0	a 24.0	26	a 100	a 20	77.0	.....
12	.....	a 335	a 4.0	a 20.0	27	a 250	a 20	41.0	.....
13	.....	a 285	a 4.0	a 16.0	28	a 363	a 20	27.0	.....
14	.....	a 230	a 4.0	a 12.0	29	a 343	a 20	18.2	.....
15	.....	a 225	a 4.0	a 8.0	30	a 330	a 20	27.0	.....
					31	a 305	.....	a 27.0	.....

a Estimated.

NOTE.—1914: Stage-discharge relation affected by ice Mar. 30 to Apr. 7. No flow May 24 to June 12 and after June 30.
1915: Stage-discharge relation affected by ice Mar. 23–30. Shifting control Apr. 7–27. No flow May 3–5, 7–13, and 24–31. No observations after June 16.
1916: Stage-discharge relation affected by ice Mar. 22 to Apr. 6. Determinations only roughly approximate, consisting chiefly of interpolations between measurements.

Monthly discharge of Bigbreed Creek near Buzzard's ranch, Sask., 1914–1916.

[Drainage area, 83 square miles].

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1914.						
March 30–31	32.00	25.00	28.00	0.343	0.026	113
April	63.00	.34	17.20	.207	.231	1,023
May	2.80	.00	.37	.004	.005	23
June	10.40	.00	1.70	.020	.020	101
The period	.....	.....	.....	.....	.282	1,260
1915.						
March 23–31	63.00	.67	33.00	.398	.13	589
April	130.00	.07	15.8	.190	.20	940
May	9.30	.00	1.03	.012	.01	63
June	5.70	.00	a 1.82	.022	.02	108
The period	.....	.....	.....	.....	.36	1,700
1916.						
March 22–31	363	10.0	183.0	.....	.....	3,621
April	335	20.0	121.0	.....	.....	7,200
May	136	4.0	16.7	.....	.....	1,027
June 1–20	30	2.3	17.5	.....	.....	696
The period	.....	.....	.....	.....	.....	12,544

Mean monthly discharge, in second-feet, of Bigbreed Creek near Buzzard's ranch, Sask., 1914–1916.

Year	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Total in acre-feet.
1914	[a] 28.0	17.2	0.37	1.70	0	0	0	0	1,260
1915	[b] 9.6	15.8	1.03	[c] 1.82	0	0	0	0	1,700
1916	59.0	121.0	16.70	[b] 11.70	.....	.....	.....	.....	12,544
Average	[d] 23	51	6.0	5.1	.....	.....	.....	.....	5,168
Average run-off, acre-feet	1,414	3,035	369	304	.....	.....	.....	.....	5,122
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	62

[a] Incomplete record not included in average. [b] Reduced to monthly average. [c] Estimated.
[d] March, 1916, averaged for 2 years, as conditions were abnormal.

NOTE.—Records published in report for 1915 have been revised.
Records for 1916 are only roughly approximate, being mostly interpolations between measurements.

LITTLEBREED CREEK NEAR BUZZARD'S RANCH, SASK.

LOCATION.—In NW. ¼ sec. 11, T. 2, R. 11 W. third meridian, near Coriander, Sask.

DRAINAGE AREA.—61 square miles.

RECORDS AVAILABLE.—Open-water flow (incomplete records), March 28, 1914, to June 20, 1916, when station was discontinued.

GAGE.—Vertical staff; read by George A. Brown.

DISCHARGE MEASUREMENTS.—Made by wading or by weir.

CHANNEL AND CONTROL.—Both banks covered with willow scrub and subject to overflow at high stages. One channel at all stages. Control not permanent above ordinary stages.

EXTREMES OF DISCHARGE.—1914–1916: Maximum stage recorded, 6.37 feet March 28, 1916 (discharge, 695 second-feet); no flow during periods in each year.

ACCURACY.—Stage-discharge relation fairly permanent except during periods of spring break-up. Gage read daily to hundredths. Records fair.

Discharge measurements of Littlebreed Creek near Buzzard's ranch, Sask., 1914–1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*	1915.		*Feet.*	*Sec.-ft.*
Mar. 31	E. W. W. Hughes	1.23	0.80	July 10	F. R. Steinberger	Dry.	0
31	do	1.84	7.20	21	do	0.55	[a] 36
Apr. 1	do	3.36	18.70	Aug. 4	do	Dry.	0
2	do	4.52	74.00	13	do	do	0
26	do	.38	[a] 02	31	do	do	0
May 4	do	.....	0	Sept. 8	do	do	0
20	do	.....	0	21	do	do	0
June 8	do	.....	0	Oct. 14	do	do	0
13	do	1.82	6.10				
27	do	.63	.74	1916.			
July 3	do	.....	0	Mar. 24	J. E. Caughey	5.28	96.00
28	do	.....	0	25	do	4.68	63.00
Oct. 26	do	.....	0	27	do	4.78	364.00
				28	do	6.38	695.00
1915.				29	do	6.44	482.00
Mar. 29	F. R. Steinberger	2.50	12.80	30	do	6.20	433.00
30	do	3.10	17.40	31	do	6.07	394.00
31	do	2.62	15.20	Apr. 1	do	5.81	244.00
Apr. 1	do	2.50	13.80	3	do	4.84	115.00
6	do	3.13	22.00	4	do	4.57	79.00
7	do	2.25	12.30	11	do	5.50	292.00
8	do	1.62	6.70	14	do	5.13	177.00
9	do	1.22	4.00	21	do	2.13	13.00
10	do	1.04	1.91	May 20	do	.90	1.49
12	do	.82	[a] 79	29	do	1.75	6.90
20	do	.42	0	June 20	do	.70	[a] 33
28	do	Dry.	0	Aug. 13	L. B. P. Miles	Dry.	0
June 7	do	1.04	2.30	Sept. 12	do	do	0
16	do	.50	[a] 18	Nov. 18	do	do	0

[a] Weir measurement

Daily discharge, in second-feet, of Littlebreed Creek near Buzzard's ranch, Sask., 1914–1916.

Day.	Mar.	Apr.	June.	Aug.	Sept.	Oct.	Day.	Mar.	Apr.	June.	Aug.	Sept.	Oct.
1914.							1914.						
1		18.70	0	0	0	0	16		12.40	4.70	0	1.30	0
2		74.00	0	0	0	0	17		3.00	1.98	0	.30	0
2		54.00	0	0	0	0	18		2.10	1.24	0	0	0
4		41.00	0	0	0	0	19		1.70	.40	0	0	0
5		30.00	0	0	0	0	20		2.10	.32	0		0
6		39.00	0	0	0	0	21		1.62	.08	0	0	0
7		12.50	0	0	0	6.80	22		1.54	.06	0	0	0
8		8.30	0	0	0	4.40	23		1.24	0	0	0	0
9		4.00	0	0	0	1.00	24		1.18	0	0	0	0
10		2.70	0	0	0	.85	25		.28	1.09	1.46	0	0
11		2.20	0	0	0	1.15	26		.06	5.80	.70	0	0
12		3.10	0	0	0	0	27		0	.64	0	0	0
13		3.20	7.40	0	0	0	28		0	.30	0	0	0
14		11.80	26.00	0	0	0	29	0.20	0	.10	0	0	0
15		14.80	2.70	0	0	0	30	.50	0	0	0	0	0
							31	4.00	0	0	0	0	0

Day.	March.	April.	May.	June.	Day.	March.	April.	May.	June.
1915.					1916.				
1		17.80	0	3.60	1		244.0	a 10.00	a 5.00
2		31.00	0	10.60	2		a 174.0	a 10.00	a 5.00
3		125.00	0	0	3		115.0	a 10.00	a 4.80
4		95.00	0	0	4		79.0	a 9.60	a 4.70
5		42.00	0	0	5		a 62.0	a 9.40	a 5.00
6		22.00	0	0	6		a 47.0	a 9.20	a 7.00
7		10.60	0	2.30	7		a 47.0	a 9.00	a 8.00
8		6.20	0	0	8		a 47.0	a 8.40	a 8.00
9		4.00	0	0	9		a 59.0	a 8.00	a 7.00
10		1.91	0	0	10		a 231.0	a 7.50	a 6.00
11		a .85	0	0	11		292.0	a 7.00	a 5.00
12		.79	0	0	12		a 292.0	a 6.00	a 4.00
13		3.20	0	0	13		a 239.0	a 5.00	a 3.00
14		2.89	0	0	14		177.0	a 4.50	a 2.00
15		2.50	13.30	0	15		a 130.0	a 4.00	a 1.00
16		0	14.30	.18	16		a 60.0	a 3.00	a .80
17		0	16.60	0	17		a 46.0	a 2.00	a .60
18		0	4.80	0	18		a 46.0	a 1.60	a .40
19		0	3.00	0	19		a 60.0	a 1.50	a .35
20		0	2.70	0	20		a 30.0	1.49	.33
21		0	2.40	0	21		13.0	1.27	.....
22		0	1.93	0	22		a 5.0	a 13.0	.84	.....
23		0	1.38	0	23		a 15.0	a 12.0	.83	.....
24		0	.90	0	24		a 96.0	a 12.0	.83	.....
25		0	0	0	25		63.0	a 12.0	220.00	.....
26		0	0	0	26		a 275.0	a 12.0	81.00	.....
27		0	0	0	27		364.0	a 11.0	36.00	.....
28	22.0	0	0	0	28		695.0	a 11.0	14.00	.....
29	16.6	0	0	0	29		482.0	a 11.0	6.90	.....
30	21.0	0	0	0	30		433.0	a 10.0	6.00	.....
31	19.1	0	0	0	31		394.0	.....	a 5.40	.....

a Estimated.

NOTE.—1914: Ice in channel Mar. 28 to Apr. 1. No flow Apr. 27 to June 12, June 23, 24, June 30 to Aug. 24, Aug. 27 to Sept. 15, Sept. 18 to Oct. 6, Oct. 12–31.

1915: Shifting control Mar. 28–31, Apr. 7-10, and Apr. 15. No flow Apr. 16 to May 14, and May 25–31. Dry after July 1.

1916: Determinations of discharge only roughly approximate, consisting chiefly of interpolations between discharge measurements.

Monthly discharge of Littlebreed Creek near Buzzard's ranch, Sask., 1914–1916.

[Drainage area, 61 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1914.						
March 28–31	4.00	0.20	1.22	0.0200	0.001	10
April	74.00	.....	11.70	.1910	.213	696
May	.....	.....	.....	.....	.....	0
June	26.00	.....	1.76	.0290	.032	106
July	.....	.....	.....	.....	.....	0
August	1.46	.....	.07	.0010	.001	4
September	1.30	.....	.05	.0009	.001	3
October	6.80	.....	.46	.0070	.008	28
The period	.....	.....	.....	.....	.256	847
1915.						
March 28–31	21.0	16.60	18.2	.298	.04	144
April	125.0	.00	12.2	.200	.22	726
May	16.6	.00	1.98	.032	.04	122
June	.....	.....	[a].50	.025	.03	89
The period	.....	.....	.....	.....	.33	1,081
1916.						
March 22–31	695.0	5.00	282.0	4.620	1.72	5,592
April	292.0	10.00	86.0	1.410	1.57	5,117
May	220.0	.83	16.1	.264	.30	990
June 1–20	8.0	.33	3.9	.064	.05	155
The period	.....	.....	.....	.....	3.64	11,854

[a] Estimated.

Mean monthly discharge, in second-feet, of Littlebreed Creek near Buzzard's ranch, Sask., 1914–1916.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Total in acre-feet.
1914	[a]1.22	11.70	0	1.76	0	0.07	0.05	0.46	847
1915	[a]18.20	12.20	1.98	[b]1.50	0	0	0	0	1,081
1916	[c]91.00	86.00	16.10	[c]2.60	.....	.....	.....	.....	11,854
Average	[d]23	37	6.0	1.95	0	.04	.02	.23	4,594
Average run-off, acre-feet	1,414	2,202	369	116	0	2	1	14	4,118
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	68

[a] Incomplete record not included in average.
[b] Estimated.
[c] Reduced to monthly average.
[d] March, 1916, average for 4 years as conditions were abnormal.

NOTE.—Records published in report for 1915 have been revised. Records for 1916 are roughly approximate, being mostly interpolated between measurements.

BEAVER CREEK NEAR MALTA, MONT.

LOCATION.—In NW. ¼ sec. 30, T. 28 N., R. 33 E., on highway bridge at Hales crossing, at site of proposed reservoir of United States Reclamation Service, 28 miles southeast of Malta, in Phillips County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 31 to December 31, 1917.

GAGE.—Chain gage on downstream handrail of highway bridge.

DISCHARGE MEASUREMENTS.—Made from highway bridge or by wading at old ford crossing, 500 feet above bridge.

CHANNEL AND CONTROL.—Channel is straight for 150 feet above and 200 feet below gage. Banks are high and practically without vegetation. Left bank is overflowed at gage height 18.5 feet. The low-water control is gravel and cobblestone bar 400 feet below gage; probably shifting. At stages above gage height 12.5 feet the river cuts across the first oxbow loop below and has a decided increase of slope, materially increasing the discharge. Point of zero flow about 0.10 foot.

EXTREMES OF DISCHARGE.—1917: Maximum stage recorded, 19.5 feet, April 6, 1917 (discharge, 4,990 second-feet); minimum stage, 0.0 foot, pool stage; no flow.

ICE.—Creek practically freezes solid during winter and ice jams are frequent during the spring break-up. No records obtained for this period.

DIVERSIONS.—No diversions from main stream; several on small tributaries above.

REGULATION.—None.

ACCURACY.—Stage-discharge relation was permanent during 1917; rating curve developed by 7 measurements made in 1916, 1917, and 1918; well defined between 10 and 3,000 second-feet. Gage read daily to hundredths. Records good.

Discharge measurements of Beaver Creek near Malta, Mont., 1916–17.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1916.		*Feet.*	*Sec.-ft.*	1917.		*Feet.*	*Sec.-ft.*
Aug. 16	Tuttle and Schlecht....	0.51	9.8	Apr. 21	Anderson and Hill.....	3.40	222
				May 19	Tuttle and Stratton....	.88	22.1

Daily discharge, in second-feet, of Beaver Creek near Malta, Mont., 1917.

Day.	Apr.	May.	June.	Day.	Apr.	May.	June.	Day.	Apr.	May.	June.
1.....	803	70	7.1	11.....	1,200	32	10.4	21.....	231	15.3	14.2
2.....	2,130	63	6.5	12.....	943	28	11.3	22.....	275	16.0	14.6
3.....	2,840	63	7.1	13.....	712	24	11.9	23.....	253	22	13.9
4.....	2,430	77	7.1	14.....	517	21	12.5	24.....	264	20	12.5
5.....	3,240	70	6.8	15.....	341	20.0	16.4	25.....	231	17.6	11.9
6.....	4,990	57	6.5	16.....	264	20.0	17.2	26.....	176	16.0	9.5
7.....	4,290	51	7.7	17.....	176	18.4	18.4	27.....	100	13.6	8.9
8.....	4,220	51	8.3	18.....	165	17.6	20.0	28.....	70	12.8	6.5
9.....	3,380	46	8.9	19.....	176	20.0	16.8	29.....	70	12.5	4.5
10.....	2,170	36	9.5	20.....	231	12.5	15.3	30.....	70	10.7	3.0
								31.....	.....	8.9	.....

NOTE.—No flow after July 1, 1917. Four discharge measurements made in 1918 were used in computing the daily discharge for 1917.

Monthly discharge of Beaver Creek near Malta, Mont., 1917.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
April	4,990	70	1,230	73,200
May	77	8.9	31.1	1,910
June	20.0	3.0	10.8	643
July	0	0	0	0
The period	.....	.....	.....	75,800

BEAVER CREEK NEAR SACO, MONT.

LOCATION.—In sec. 35, T. 31 N., R. 32 E., at Craig's ranch, 3 miles south of Ashfield, near Sacho, the nearest post office, and about 18 miles from Malta in Phillips County.

RECORDS AVAILABLE.—July 5, 1903, to November 13, 1912.

DRAINAGE AREA.—Not measured.

GAGE.—Overhanging chain. The gage was first established at bridge No. 455 of the Great Northern Railway, half a mile west of Ashfield; it was moved to its present location, 2½ miles farther upstream, December 31, 1903.

CHANNEL.—The stream has a narrow winding channel cut about 20 feet deep into the gently sloping prairie. At flood stages the water overflows the banks and spreads out for considerable distance on each side. The channel carries little water except at the times of the spring floods or heavy rains, and during the summer months it is obstructed by a dense growth of weeds and willows, which have to be cleared out occasionally. At medium and high stages a second channel, known as Beaver Creek overflow, receives the stream above the station, fills a depression to the west of the main channel, and reenters at a point some distance below the gage.

DISCHARGE MEASUREMENTS.—Made from a cable or by wading.

ICE.—Ice present during the winter months, but there is practically no flow.

DIVERSIONS.—Water is diverted from Beaver Creek by small ditches and by pumping plants.

ACCURACY.—Stage-discharge relation not permanent. The primary control of sand and gravel changes, and shifts are also caused by the growth of grass, weeds, and willows along the banks. Records are poor.

Discharge measurements of Beaver Creek near Saco, Mont., 1903–1906 and 1908–1912.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1903.		*Feet.*	*Sec.-ft.*	1909.		*Feet.*	*Sec.-ft.*
July. 22	A. E. Place	1.21	60	June 19	W. A. Lamb	3.40	107
				20	do	4.25	159
1904.				July 1	do	4.00	151
Apr. 6	W. B. Freeman	7.15	352	23	do	.60	15
7	do	7.55	433	Aug. 23	do	—.30	.1
9	do	10.40	1,272				
11	do	5.76	276	1910.			
14	do	2.37	88	Apr. 27	W. A. Lamb	—.35	1.0
May 13	C. C. Babb	—.60	.5				
				1911.			
1905.				Apr. 14	J. C. Beebe	2.42	15.8
June 28	C. T. Prall	4.55	169	June 13	do	2.39	19.8
July 29	W. B. Freeman	.17	7	24	do	3.00	39
30	do	1.78	46	30	do	4.09	79
30	do	1.69	42	July 31	do	2.78	31
30	do	1.86	49	Oct. 10	W. A. Lamb	3.40	61
1906.				1912.			
June 4	Freeman and Hartman	8.59	594	Apr. 27	B. E. Jones	2.85	57
July 14	W. B. Freeman	.05	19.2	May 8	do	10.62	716
				23	R. R. Randell	2.70	50
1908.				June 16	do	1.60	6.8
May 2	A. F. Huch	.35	1.8	July 27	do	1.30	1.6
12	Stewart and Huch	.14	.4	Aug. 29	do	4.70	146
June 8	A. F. Huch	.00	.01	Sept. 8	do	3.43	80
				Nov. 13	do	1.66	9.1
1909.							
Apr. 22	W. A. Lamb	.14	3.0				

NOTE.—1903: Aug. 16, A. E. Place measured with floats 21.6 second-feet in the ditch of the Blum Cattle Co., 3 miles above the station. Sept. 12, E. W. Myers estimated the flow 10 miles above the station at 0.5 second-foot.
1904: Apr. 9, float measurement. May 13, discharge estimated.
1908: May 12 and June 8, float measurements.
1909: Aug. 23, discharge estimated.

Mean daily gage height, in feet, of Beaver Creek near Saco, Mont., 1903.

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	1.60	2.70	2.40	2.00	1.90	16	1.10	3.20	2.70	2.10	1.90	1.70
2	.....	.....	2.70	2.30	2.00	1.90	17	1.10	3.10	2.70	2.10	1.90	1.70
3	.....	2.60	2.80	2.30	2.00	1.90	18	1.00	3.00	2.60	2.10	1.90	1.70
4	.....	2.70	2.90	2.30	2.00	1.80	19	.....	2.90	2.60	2.10	1.90	1.70
5	.....	3.10	3.00	2.30	2.00	1.80	20	1.30	2.90	2.60	2.10	1.90	1.70
6	.....	3.10	3.20	2.20	1.90	1.80	21	1.30	2.80	2.50	2.10	1.90	1.70
7	0.30	3.10	3.20	2.20	1.90	1.80	22	1.20	2.80	2.50	2.10	1.90	1.70
8	1.00	3.20	3.20	2.20	1.90	1.70	23	1.20	2.70	2.50	2.10	1.90	1.70
9	1.20	3.20	3.10	2.20	1.90	1.70	24	1.10	2.60	2.50	2.10	1.90	1.70
10	1.10	3.20	3.00	2.20	1.90	1.70	25	1.00	2.60	2.50	2.10	1.90	1.70
11	1.30	3.30	3.00	2.20	1.90	1.70	26	.30	2.50	2.40	2.10	1.90	1.70
12	1.30	3.30	2.90	2.20	1.90	1.70	27	.20	2.70	2.40	2.10	1.90	1.70
13	1.20	3.30	2.90	2.10	1.90	1.70	28	.30	2.70	2.40	2.10	1.90	1.70
14	1.30	3.20	2.80	2.10	1.90	1.70	29	.30	2.70	2.40	2.10	1.90	1.70
15	1.20	3.20	2.70	2.10	1.90	1.70	30	.40	2.70	2.40	2.00	1.90	1.70
							31	.50	2.70	.....	2.00	.....	1.70

NOTE.—A dam erected Aug. 2, 1903, about a mile below the station accounts for rise of water level. Readings are to top of ice Nov. 15 to Dec. 31. Sufficient discharge measurements were not obtained to justify computation of daily discharge.

Daily discharge, in second-feet, of Beaver Creek near Saco, Mont., 1904–1906 and 1909–1912.

Day.	April.	May.	Day.	April.	May.	Day.	April.	May.
1904.			1904.			1904.		
1	.....	5	11	278	.....	21	39	.....
2	.....	5	12	194	.....	22	33	.....
3	.....	4	13	140	.....	23	29	.....
4	.....	4	14	115	.....	24	23	.....
5	.....	3	15	93	.....	25	18	.....
6	338	1	16	83	.....	26	15	.....
7	1,128	.....	17	91	.....	27	12	.....
8	1,623	.....	18	83	.....	28	11	.....
9	1,278	.....	19	67	.....	29	8	.....
10	708	.....	20	49	.....	30	6	.....

Day.	Mar.	June.	July.	Aug.	Day.	Mar.	June.	July.	Aug.
1905.					1905.				
1	.....	.....	82	90	16	15	46	17	6
2	.....	.....	58	26	17	13	43	13	.....
3	.....	.....	43	26	18	11	37	9	.....
4	.....	.....	31	20	19	11	31	7	.....
5	.....	.....	22	43	20	9	25	6	.....
6	.....	.....	19	38	21	6	22	5	.....
7	.....	.....	15	19	22	5	17	4	.....
8	.....	.....	11	7	23	4	17	4	.....
9	.....	.....	7	6	24	3	25	4	.....
10	.....	.....	6	5	25	2	54	6	.....
11	.....	.....	6	4	26	2	74	37	.....
12	54	17	13	4	27	2	66	46	.....
13	31	28	22	5	28	2	170	50	.....
14	26	28	25	5	29	.....	140	9	.....
15	19	34	22	6	30	.....	155	51	.....
					31	.....	.....	98	.....

Day.	May.	June.	July.	Day.	May.	June.	July.	Day.	May.	June.	July.
1906.				1906.				1906.			
1	.....	695	3,700	11	.....	5,500	36	21	.....	95	4
2	.....	1,230	1,670	12	.....	5,000	28	22	.....	70	4
3	.....	1,290	365	13	.....	3,700	20	23	.....	78	2
4	.....	660	195	14	.....	2,120	16	24	.....	78	2
5	.....	365	139	15	.....	590	12	25	30	63	1
6	.....	302	98	16	.....	315	10	26	280	47	1
7	.....	450	78	17	.....	270	10	27	785	44	1
8	.....	5,000	50	18	.....	220	8	28	1,380	55	0
9	.....	6,650	34	19	.....	164	8	29	1,500	202	.....
10	.....	6,100	25	20	.....	132	8	30	1,010	4,000	.....
								31	935	.....	.....

Daily discharge, in second-feet, of Beaver Creek near Saco, Mont., 1904–1906 and 1909–1912—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Day.	Mar.	Apr.	May.	June.	July.	Aug.
1909.							1909						
1	.....	3.5	4.0	35	151	41	16	90	5.0	4.0	240	41	8.0
2	.....	5.0	4.0	32	116	44	17	82	5.0	4.0	175	38	5.0
3	.....	5.0	4 0	32	116	47	18	74	5.0	4.0	151	38	3.5
4	.....	5 0	4.0	32	116	41	19	66	5.0	4.0	151	35	3.0
5	.....	5.0	4.0	32	116	35	20	62	5.0	4.0	163	29	3.0
6	.....	5.0	4.0	29	111	16	21	244	5.0	10	212	26	.....
7	44	5.0	4.0	26	108	14	22	326	5.0	12	222	23	.....
8	230	5.0	4.0	26	98	12	23	445	4.0	20	233	18	.....
9	250	5.0	4.0	26	56	8.0	24	342	4.0	50	264	14	.....
10	190	5.0	4.0	26	53	6.0	25	230	4.0	50	516	12	.....
11	184	5.0	4.0	26	53	6.0	26	82	4.0	47	755	12	.....
12	148	5.0	4.0	26	53	6.0	27	54	4.0	44	565	12	.....
13	130	5.0	4.0	64	53	8.0	28	54	4.0	41	482	12	.....
14	124	5.0	4.0	247	47	8.0	29	40	4.0	41	385	16	.....
15	118	5.0	4.0	247	46	8.0	30	22	4.0	38	282	22	.....
							31	7	.....	38	.....	38	.....

Day.	Mar.	Apr.	May.	Aug.	Day.	Mar.	Apr.	May.	Aug.
1910.					1910.				
1	.....	34	0.5	.....	16	108	3.5	.....	5
2	.....	34	.5	.....	17	106	3.5	.....	.....
3	.....	34	.5	.....	18	86	3.5	.....	.....
4	.....	30	0	.....	19	78	3.5	.....	.....
5	.....	30	0	.....	20	62	3.0	.....	.....
6	.....	42	0	.....	21	58	3.0	.....	.....
7	.....	56	0	.....	22	48	3.0	.....	.....
8	.....	58	.....	.....	23	48	2.5	.....	.....
9	.....	52	.....	.....	24	48	2.0	.....	.....
10	.....	30	.....	.....	25	44	1.5	.....	.....
11	.....	23	.....	.....	26	41	1.0	.....	.....
12	.....	13	.....	.....	27	38	.9	.....	.....
13	130	9	.....	23	28	35	.8	.....	.....
14	124	3.5	.....	16	29	34	.5	.....	.....
15	116	3.5	.....	10	30	34	.5	.....	.....
					31	34	.....	.....	.....

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1911.									
1	.....	.....	.....	.....	.....	21	.....	6.0	0.5
2	.....	.....	.....	.....	.....	14	.....	4.0	.5
3	.....	.....	.....	.....	.....	11	.....	21	.5
4	.....	.....	.....	.....	.....	8.0	.....	37	.5
5	.....	.....	.....	.....	.....	6.0	10	77	.....
6	.....	.....	.....	.....	.....	5.0	49	122	.....
7	.....	.....	.....	.....	.....	3.2	97	.....	.....
8	.....	.....	.....	.....	.....	2.5	438	.....	.....
9	.....	16	.....	.....	.....	1.8	486	.....	.....
10	.....	13	.....	.....	.....	.....	454	47	.....
11	.....	9.0	.....	.....	.....	.....	339	29	.....
12	.....	8.4	.....	.....	.....	.....	290	22	.....
13	.....	.....	.....	17	.....	.....	269	16	.....
14	.....	19	.....	13	.....	.....	214	11	.....
15	.....	.....	.....	11	.....	.....	190	8.0	.....
16	.....	.....	.....	9.6	.....	.....	166	8.0	.....
17	.....	.....	.....	9.6	.....	.....	142	8.0	.....
18	.....	.....	.....	7.6	.....	.....	122	8.0	.....
19	.....	.....	.....	7.6	.....	.....	92	8.0	.....
20	.....	.....	.....	7.6	.....	.....	72	6.0	.....
21	.....	.....	.....	7.6	.....	.....	53	6.0	.....
22	.....	.....	.....	5.4	.....	.....	41	6.0	.....
23	172	.....	.....	5.4	.....	.....	35	6.0	.....
24	127	.....	.....	39	.....	.....	33	4.0	.....
25	87	.....	.....	10	.....	.....	27	3.2	.....
26	72	.....	.....	45	.....	.....	20	1.0	.....
27	63	.....	.....	122	.....	.....	15	1.0	.....
28	55	.....	77	227	37	.....	12	1.0	.....
29	43	.....	395	148	43	.....	11	1.0	.....
30	29	.....	582	82	45	.....	7	1.0	.....
31	27	.....	630	.....	35	.....	.....	1.0	.....

Daily discharge, in second-feet, of Beaver Creek near Saco, Mont., 1904–1906 and 1909–1912—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1912.								
1	.....	19	89	1.0	8.8	72	3.4	13
2	.....	17	79	3.6	8.8	55	3.4	13
3	.....	21	72	7.6	8.8	41	3.4	13
4	.....	29	57	32	10	45	3.4	10
5	.....	30	47	74	12	55	3.4	10
6	.....	40	45	170	12	79	5.2	9.7
7	342	100	43	460	12	89	5.2	9.7
8	262	650	31	470	8.5	84	5.2	9.7
9	152	700	27	510	6.0	65	5.2	9.7
10	89	700	19	610	6.0	49	7.3	9.4
11	67	600	15	530	8.5	24	7.3	9.2
12	57	230	11	404	8.5	16	7.3	9.0
13	47	294	9.7	286	8.5	9.4	7.3	8.8
14	53	195	8.2	202	8.5	5.6	7.3	.....
15	45	158	6.8	134	8.5	5.6	10	.....
16	65	124	6.8	104	12	5.6	10	.....
17	109	104	28	74	12	5.6	12	.....
18	164	74	61	51	17	5.6	21	.....
19	170	63	84	37	41	7.9	31	.....
20	152	53	89	25	94	11	27	.....
21	164	45	99	19	188	11	23	.....
22	176	39	99	19	359	9.1	17	.....
23	188	49	84	15	490	16	17	.....
24	170	53	57	15	460	9.1	13	.....
25	114	84	41	10	368	7.6	13	.....
26	89	140	26	3.2	286	6.4	13	.....
27	59	182	14	.8	230	5.4	13	.....
28	43	209	7.9	.8	182	5.4	13	.....
29	29	176	4.6	3.2	152	5.4	13	.....
30	21	140	2.8	6.2	114	3.4	13	.....
31	.....	119	.....	6.2	89	.....	13	.....

NOTE.—1903: No estimate of discharge was made for 1903 on account of insufficient discharge measurements. (See table of discharge measurements with footnote and table of daily gage heights for 1903.)

1904–1906: Apr. 7, 1904, reservoir broke above gaging station. Creek dry except for periods noted in tables of daily discharge during 1904 to 1906.

Daily discharge estimated June 8–11, 1906: Maximum discharge during this period was estimated from high-water marks.

1908: Gage heights erroneous: flow not determined. Creek probably dry after July 1.

1909–1910: Gage readings for 1909 also are unreliable. Stream probably dry Aug. 21, 1909, to Mar. 4, 1910. The creek began to flow Mar. 5, 1910, but no gage heights were recorded until Mar. 13. Channel dry May 4 to Aug. 12 and Aug. 17 to Dec. 31, 1910.

1911: Record fragmentary; discharge determined only for days for which gage heights were recorded.

1912: Daily discharge estimated May 5–7 and 9–11.

Monthly discharge of Beaver Creek near Saco, Mont., 1904–1906 and 1909–1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1904.				
April 6–30	1,623	6	258	12,793
May 1–6	5	1	4	48
The period	.....	.....	.....	12,841
1905.				
March	54	0	7.2	428
June	170	0	34.3	2,041
July	98	4	24.1	1,482
August	90	0	10.0	615
The period	.....	.....	.....	4,566
1906.				
May 25–31	1,500	30	846	11,700
June	6,650	44	1,510	89,800
July 1–27	3,700	1	242	13,000
The period	.....	.....	.....	114,500

Monthly discharge of Beaver Creek near Saco, Mont., 1904–1906 and 1909–1912—Continued.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1909.				
March 7–31	445	7	146	7,240
April	5	3.5	4.68	278
May	50	4	14.9	916
June	755	26	190	11,300
July	151	12	54.2	3,330
August	47	0	10.4	640
September	0	0	0	0
October	0	0	0	0
November	0	0	0	0
December	0	0	0	0
The period	.....	.....	.....	23,700
1910.				
March	.....	0	170	10,500
April	34	5	15.1	898
May	5	0	.05	3
June	0	0	0	0
July	0	0	0	0
August	23	0	1.74	107
The period	.....	.....	.....	11,500
1912.				
April 7–30	342	21	118	5,620
May	700	17	175	10,800
June	99	2.8	42.1	2,510
July	610	.8	138	8,480
August	490	6.0	104	6,400
September	89	3.4	27	1,600
October	31	3.4	11.2	689
November 1–13	13	8.8	10.3	266
The period	.....	.....	.....	36,400

NOTE.—1906: The maximum discharge for June computed from high-water marks.
1910: Mar. 1–12, discharge estimated from high-water marks noted by the observer. As the flow for this period comprises most of the flow for the month the accuracy of the monthly estimate is poor.
1911: Scattering gage readings only; table of monthly discharge not prepared.
1912: The discharge for May estimated.

Mean monthly discharge, in second-feet, of Beaver Creek near Saco, Mont., 1904–1906 and 1909–1912.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total in acre-feet.
1904	.....	[a]258	[b]4	.....	.....	.....	.....	.....	.....	.....	12,800
1905	7.2	.....	.....	34.3	24.1	10.0	.....	.....	.....	.....	4,570
1906	.....	.....	[c]846	1,510	[d]242	.....	.....	.....	.....	.....	11,400
1909	[e]146	4.68	14.9	190	54.2	10.4	0	0	0	0	23,700
1910	[f]170	15.1	.05	0	0	1.74	.....	.....	.....	.....	11,500
1912	.....	[g]118	175	42.1	138	104	27	11.2	[h]10.3	.....	36,400

[a] Apr. 6–30.
[b] May 1–6.
[c] May 25–31.
[d] July 1–27.
[e] Mar. 7–31.
[f] Estimated.
[g] Apr. 7–30.
[h] Nov. 1–13.

BEAVER CREEK OVERFLOW NEAR BOWDOIN, MONT.

LOCATION.—In the SW. ¼ sec. 17, T. 30 N., R. 32 E., at John Turmell's ranch, 14 miles from Malta, Phillips County, Mont.

RECORDS AVAILABLE.—June 29, 1903, to August 30, 1906; May 2, 1908, to December 31, 1910; March 20, 1911, to November 9, 1912.

GAGE.—Vertical staff nailed to a post on the right bank directly below Turmell's house. Gage was washed out and bench marks were destroyed in the spring of 1912; gage heights for 1912 refer to new datum.

CHANNEL.—Bed of stream is sand and gravel and in summer is covered with grass and weeds. Water flows in this channel only when Beaver Creek is high; during the remainder of the season the water stands in pools and fluctuations in water level are due wholly to local rains and to evaporation.

DISCHARGE MEASUREMENTS.—At flood stages made at a bridge half a mile below the gage; low-water measurements are made by wading near the gage.

ACCURACY.—Stage-discharge relation not permanent, owing to growth of vegetation. Discharge is flood flow of Beaver Creek and so fluctuates rapidly. Records poor.

Discharge measurements of Beaver Creek overflow near Bowdoin, Mont., 1903–1906 and 1909–1912.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1903.		*Feet.*	*Sec.-ft.*	1909.		*Feet.*	*Sec.-ft.*
July 21	C. C. Babb	4.15	14.1	June 20	W. A. Lamb	6.50	168
Aug. 10	do	3.30	.2	July 1	do	5.30	46
1904.				1910.			
Apr. 6	W. B. Freeman	8.40	646	Apr. 27	W. A. Lamb	3.12	0
7	do	9.15	1,480	1911.			
9	do	8.70	942	June 13	J. C. Beebe	4.46	0
12	do	7.10	379	Oct. 10	W. A. Lamb	4.47	10
14	do	4.80	57	1912.			
20	do	3.68	2.7	Apr. 27	B. E. Jones	3.30	36
1905.				May 9	do	8.01	1,170
June 28	C. T. Prall	6.4	118	23	R. R. Randell	3.81	52
July 30	W. B. Freeman	4.8	15	June 16	do	3.63	21
1906.				July 27	do	2.01	0
June 4	Freeman and Hartman	8.08	476	Aug. 29	do	3.45	27
				Sept. 8	do	4.30	86

NOTE.—1903: Aug. 10, discharge estimated.
1905: July 30, float measurement.
1912: July 27, gage height is point of zero flow.

Daily discharge, in second-feet, of Beaver Creek overflow near Bowdoin, Mont., 1903–1906, 1909, 1910, and 1912.

Day.	July.	Aug.	Day.	July.	Aug.	Day.	July.	Aug.
1903.			1903.			1903.		
2			11	74		20	118	
3		1	12	33		21	41	
4		3	13	5		22	4	
5		2	14	3		23	2	
6		2	15	2		24	1	
7		1	16	2		25	1	
8	4	1	17	166		26	1	
9	3		18	249		27	1	
10	49		19	178		28		

Day.	Apr.	Day.	Apr.	Day.	Apr.
1904.		1904.		1904.	
5	360	13	160	21	3
6	792	14	65	22	3
7	1,740	15	84	23	3
8	1,092	16	30	24	3
9	952	17	7	25	3
10	816	18	4	26	
11	712	19	4	27	
12	330	20	4	28	

Daily discharge, in second-feet, of Beaver Creek overflow near Bowdoin, Mont., for 1903–1906, 1909, 1910, and 1912—Continued.

Day.	Mar.	June.	July.	Aug.	Day.	Mar.	June.	July.	Aug.
1905.					1905.				
1			16	7	16		13	1	
2			19	5	17		11	1	
3	43		16	4	18		9		
4	37		13	3	19		7		
5	29		11	2	20		6		
6	18	138	7	2	21		5		
7	18	23	6	2	22		4		
8	4	7	4	1	23		4		
9		6	3		24	2	3		
10		6	3		25	2	3		
11		37	2		26	2	83		
12		23	2		27	1	61		
13		143	2		28		116		
14		23	2		29		49	31	
15		19	2		30		23	16	
					31			11	

Day.	May.	June.	July.	Day.	May.	June.	July.	Day.	May.	June.	July.
1906.				1906.				1906.			
1		710	1,160	11		1,320	1	21		20	
2		800	480	12		1,000	1	22		10	
3		765	140	13		860		23		13	
4		520	76	14		440		24		15	
5		224	37	15		310		25	145	8	
6		108	16	16		150		26	420	8	
7		400	5	17		128		27	765	5	
8		(a)	4	18		90		28	860	100	
9		(a)	3	19		43		29	800	900	
10		(a)	2	20		27		30	545		
								31	545		

Day.	Mar.	Apr.	June.	July.	Day.	Mar.	Apr.	June.	July.
1909.					1909.				
1		0.2		57	16	253		145	1.0
2				27	17	96		119	
3				50	18	79		41	
4				57	19	64		21.9	
5				44	20	27		41	
6				32	21	9.0		129	
7				27	22	24.3		124	
8				27	23	262		110	
9				14.1	24	315		424	
10				11.3	25	189		956	
11				9.0	26	119		956	
12				7.0	27	96		364	
13			0.6	5.2	28	57		145	
14	9.0		157	3.6	29	9.0		124	
15	157		176	2.2	30	3.6		79	
					31	1.0			

Day.	Mar.	Apr.	Day.	Mar.	Apr.	Day.	Mar.	Apr.
1910.			1910.			1910.		
1			11		0.6	21		
2			12		.1	22		
3			13	140		23		
4			14	100		24		
5			15	60		25		
6			16	30		26		
7		10	17	10		27		
8		6.1	18	2.9		28		
9		2.9	19	.1		29		
10		1.6	20			30		
						31		

Daily discharge, in second-feet, of Beaver Creek overflow near Bowdoin, Mont., 1903–1906, 1909, 1910 and 1912—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1912.							
1	.....	22	115	36	0.0	16	0.8
2	.....	22	130	39	.0	15	.5
3	.....	19	138	56	.0	16	.8
4	.....	19	98	170	.0	16	.0
5	.....	24	75	86	.0	21	.2
6	.....	53	62	270	.0	23	.2
7	.....	168	46	660	.0	34	.0
8	.....	1,080	43	520	.0	108	.0
9	.....	1,160	37	660	.0	67	.0
10	.....	1,160	34	800	.0	46	.2
11	.....	1,120	32	520	.0	37	.2
12	.....	880	23	186	.0	25	.....
13	.....	400	21	87	.0	23	.....
14	.....	177	40	29	.0	20	.....
15	.....	145	34	20	.0	15	.....
16	.....	92	22	10	.0	14	.....
17	184	77	24	3.0	.0	9.0	.....
18	230	62	147	2.5	.0	8.0	.....
19	184	48	200	1.5	58	6.2	.....
20	144	50	170	1.8	62	4.0	.....
21	300	46	162	1.2	226	3.5	.....
22	325	67	140	.5	800	3.0	.....
23	250	46	86	.2	920	3.5	.....
24	176	57	65	.0	660	2.5	.....
25	96	207	45	.2	430	2.0	.....
26	60	235	42	.2	316	2.5	.....
27	41	169	28	.0	206	1.5	.....
28	36	208	22	.0	108	1.8	.....
29	31	175	16	.0	43	1.0	.....
30	26	130	14	.0	23	1.2	.....
31	.....	122	.....	.0	15	.....	.....

NOTE.—Stream practically dry for the following periods: Aug. 9, 1903, to Apr. 4, 1904; Apr. 26, 1904, to Mar. 2, 1905; Mar. 9 to June 5, July 18–28 and Aug. 9 to Dec. 31, 1905; Jan. 1 to May 24 and July 13 to Dec. 31, 1906; May 2, 1908, to Mar. 13, 1909; Apr. 2 to June 12 and July 17 to Sept. 10, 1909; Mar. 20 to Apr. 6, and Apr. 13 to Dec. 31, 1910; July 27 to Aug. 18, and Oct. 12 to Nov. 9, 1912. The stream was also probably dry during other winter months during the period of record although we have no statements by the observer to that effect. June 8–10 and 30, 1906, the discharge was probably in excess of 2,000 second-feet. No estimates of discharge could be made for 1911 on account of lack of current-meter measurements. (See daily gage-height table for 1911, below.)

Daily gage height, in feet, of Beaver Creek overflow near Bowdoin, Mont., 1911.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	.....	3.8	3.1	9.0	4.9	4.1	3.1	3.7	3.5
2	.....	3.7	3.1	7.9	4.8	4.0	3.0	3.6	3.5
3	.....	3.7	3.0	6.8	4.7	3.9	3.0	4.4	3.4
4	.....	3.6	3.0	6.6	4.5	3.8	3.0	4.7	3.4
5	.....	3.5	3.0	5.3	4.3	3.8	3.0	4.1	3.4
6	.....	3.5	3.0	4.8	4.1	3.7	3.3	5.7	3.4
7	.....	3.5	2.9	4.3	3.8	3.7	4.1	5.5	3.4
8	.....	3.4	2.9	4.2	3.8	3.7	7.1	4.9	3.4
9	.....	3.5	2.9	4.2	3.7	3.6	9.2	4.7	3.4
10	.....	3.5	2.9	4.1	3.6	3.5	9.1	4.4	3.3
11	.....	3.6	2.9	4.0	3.6	3.5	9.1	4.3	3.3
12	.....	3.6	2.8	4.3	3.6	3.5	9.1	4.1	.....
13	.....	3.6	2.8	4.5	3.5	3.4	8.4	3.9	.....
14	.....	3.7	2.8	4.5	3.5	3.4	7.9	3.8	.....
15	.....	3.8	2.8	4.4	3.3	3.4	6.5	3.8	.....
16	.....	4.0	2.8	4.3	3.3	3.4	6.3	3.7	.....
17	.....	3.9	2.8	4.1	3.3	3.4	6.1	3.7	.....
18	.....	3.7	2.7	4.0	3.2	3.4	5.8	3.7	.....
19	.....	3.5	2.7	3.8	3.2	3.4	5.4	3.7	.....
20	2.4	3.4	2.7	3.8	3.2	3.3	5.0	3.6	.....
21	2.4	3.4	2.7	3.8	3.1	3.3	4.9	3.6	.....
22	4.2	3.4	2.7	3.7	3.1	3.3	4.7	3.6	.....
23	5.2	3.4	2.7	3.7	3.1	3.3	4.5	3.6	.....
24	5.1	3.4	2.7	6.5	3.1	3.3	4.3	3.6	.....
25	4.9	3.4	2.7	6.0	3.1	3.2	4.1	3.5	.....
26	4.5	3.3	2.8	8.1	3.0	3.2	4.0	3.5	.....
27	4.4	3.3	2.8	7.1	3.0	3.2	3.9	3.5	.....
28	4.3	3.3	4.7	5.7	3.0	3.1	3.8	3.5	.....
29	4.1	3.2	8.6	5.3	2.9	3.1	3.7	3.5	.....
30	4.0	3.1	9.0	4.8	4.3	3.1	3.7	3.5	.....
31	3.9	.....	9.2	.....	4.3	3.1	.....	3.5	.....

NOTE.—Lack o fdischarge measurements in 1911 prevented the making of daily and monthly estimates.

Monthly discharge of Beaver Creek overflow near Bowdoin, Mont., 1903–1906, 1909, [illegible]—1910, and 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1903.				
July 8–27	249	1	47	1,864
August 3–8	3	1	2	24
1904.				
April 5–25	1,740	3	341	14,204
1905.				
March 3–8, 24–27	43	1	16	309
June 6–30	138	3	33	1,631
July 1–17, 29–31	31	1	8	333
August 1–8	7	1	3	51
The period				2,324
1906.				
May 25–31	860	145	583	8,090
June 1–7, 11–29	1,320	5	345	17,800
July 1–12	1,160	1	160	3,810
The period				29,700
1909.				
March 14–31	315	1.0	98.3	3,510
April	.2	0	0	0
May	0	0	0	0
June	956	0	137	8,150
July	57	0	12.1	744
August	0	0	0	0
The period				12,404
1910.				
March		0	75.6	4,650
April	10	0	.70	42
1912.				
April 17–30	325	26	149	4,140
May	1,160	19	266	16,400
June	200	14	70.4	4,190
July	800	.0	134	8,240
August	920	.0	125	7,690
September	108	1.0	18.2	1,080
October	.8	.0	.09	5.5
November 1–9	.0	.0	.00	.0
The period				41,700

NOTE.—No flow except on days indicated in monthly discharge tables from July 8, 1903, to 1906, except June 8–10 and 30, 1906. On these days the flow probably exceeded 2,000 second-feet and is not included in the monthly discharge table. The mean monthly flow for March, 1910, was obtained mostly from estimates of flow Mar. 5–12, 1910, based on high-water marks and statements by the observer. The accuracy is doubtful, but the flow was undoubtedly small. No estimates were made for 1911.

Mean monthly discharge, in second-feet, of Beaver Creek overflow near Bowdoin, Mont., 1903–1906, 1909, 1910, and 1912.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total in acre-feet.
1903					[a] 47	[b] 2				1,890
1904		[c] 341								14,200
1905	[d] 16			[e] 33	[f] 8	[g] 3				2,320
1906			[h] 583	[i] 345	[k] 160					29,700
1909	[l] 98.3	0	0	137	12.1	0				12,400
1910	75.6	.70								4,690
1912		[m] 149	266	70.4	134	125	18.2	0.09	[n] 0.0	41,700

[a] July 8–27.
[b] Aug. 3–8.
[c] Apr. 5–25.
[d] Mar. 3–8, 24–27.
[e] June 6–30.
[f] July 1–17, 29–31.
[g] Aug. 1–8.
[h] May 25–31.
[i] June 1–7, 11–29.
[k] July 1–12.
[l] Mar. 14–31.
[m] Apr. 17–30.
[n] Nov. 1–9.

NOTE.—The fragmentary character of this record is due to the fact that there was no flow in this channel except at medium or high stages on Beaver Creek.

ROCK CREEK NEAR BARNARD, MONT.

LOCATION.—In SE. ¼ sec. 10, T. 37 N., R. 37 E. Montana principal meridian, about 1½ miles south of international boundary, below junction with Horse Creek.

DRAINAGE AREA.—298 square miles.

RECORDS AVAILABLE.—Open-water flow, complete records, May 1, 1914, to October 31, 1917.

GAGE.—Vertical staff on right bank 100 feet below Mr. Barnard's barn; read by S. H. Barnard.

DISCHARGE MEASUREMENTS.—Made by wading above or below the gage. No cable nor bridge for high-water measurements.

CHANNEL AND CONTROL.—Bed of stream clay, permanent. Right bank clay; overflow never known; left bank clay; is overflowed during extremely high water. Control is a gravel bed 300 feet below gage at a ford; permanent.

EXTREMES OF DISCHARGE.—1914–1917: Maximum discharge estimated at 1,000 second-feet March 30 and 31 and April 1, 1916: no flow May 21, May 28 to June 8, July 19 to August 3, 1914; August 3 to August 6 and August 18 to September 8, 1917.

ICE.—Station not maintained during winter.

DIVERSIONS.—Charles Bowrey has an irrigation project 1 mile above station.

ACCURACY.—Stage-discharge relation practically permanent.

Discharge measurements of Rock Creek near Barnard, Mont., 1914–1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
Apr. 30	E. W. W. Hughes	1.01	9.40	Apr. 19	J. E. Caughey	3.65	[a] 312.0
June 30	do	1.02	9.90	May 24	do	2.40	[b] 18.3
July 1	do	.50	.87	June 24	do	3.30	81.0
				Aug. 12	L. B. P. Miles	1.95	3.0
1915.				Sept. 14	do	1.98	4.9
Apr. 24	F. R. Steinberger		9.6	Nov. 21	do	1.96	[c] 3.4
June 12	do	.83	5.9				
July 15	do	.66	2.6	1917.			
Aug. 9	do	.64	2.6	May 17	P. A. Fetterley	2.32	21.00
Sept. 4	do	.25		July 13	do	1.86	1.64
Oct. 19	do	1.65	1.3	Aug. 16	do	1.71	1.05
				Oct. 18	do	[c] 1.95	3.10

[a] Measurement made at old station.
[b] New gaging station established below junction with Horse Creek.
[c] Ice present.

Daily discharge, in second-feet, of Rock Creek near Barnard, Mont., 1914–1917.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1914.							1914.						
1	11.4	0	0.85	0	1.55	[a] 0.50	16	9.8	10.2	10.20	[a] 0.50	1.55	5.00
2	11.4	0	11.00	0	[a] .50	[a] .50	17	9.8	10.2	10.20	[a] .50	1.55	[a] 4.50
3	11.4	0	8.70	0	[a] .50	[a] .50	18	10.6	9.0	10.20	[a] .50	1.55	[a] 4.00
4	11.0	0	7.40	22.00	[a] .50	[a] .50	19	10.6	8.4	0	[a] .50	1.15	3.20
5	11.0	0	7.10	13.80	[a] .50	1.55	20	10.6	8.7	0	[a] .50	1.15	2.50
6	10.6	0	7.10	6.10	[a] .50	5.00	21	0	9.0	0	[a] .50	1.15	8.00
7	10.6	0	[a] 7.10	2.00	[a] .50	7.40	22	10.6	9.8	0	[a] .50	1.15	2.50
8	10.6	0	[a] 7.10	2.00	[a] .50	67.00	23	[a] 10.6	9.0	0	[a] .50	1.15	2.50
9	10.6	21.0	[a] 7.10	[a] 1.55	[a] .50	35.00	24	[a] 10.6	9.0	0	[a] .50	[a] .50	2.50
10	10.6	17.0	[a] 7.10	[a] 1.15	[a] .50	[a] 26.00	25	[a] 10.6	9.8	0	21.00	[a] .50	2.50
11	10.6	13.0	[a] 7.10	[a] 1.00	[a] .50	[a] 20.00	26	[a] 10.6	9.0	0	21.00	[a] .50	[a] 2.50
12	10.0	11.8	47.00	[a] .85	[a] .50	[a] 15.00	27	[a] 10.6	7.4	0	15.00	[a] .50	[a] 2.50
13	10.6	11.0	45.00	[a] .50	[a] .50	11.00	28	0	7.7	0	11.00	[a] .50	[a] 2.50
14	10.6	9.0	21.00	[a] .50	[a] .50	9.00	29	0	6.1	0	5.00	[a] .50	[a] 2.50
15	10.2	9.0	10.20	[a] .50	2.50	6.10	30	0	9.0	0	4.00	[a] .50	2.50
							31	0	.....	0	2.00	.....	[a] 2.50

[a] Estimated.

Daily discharge, in second-feet, of Rock Creek near Barnard, Mont., 1914–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1915.								
1	.....	a30.0	b 8.3	14.9	a10.4	b 4.30	b 0.25	0.01
2	.....	a32.0	7.5	11.7	a 8.6	4.30	b .19	b .02
3	.....	a35.0	7.5	a11.0	a 8.2	a 4.30	b .09	b .05
4	.....	a44.0	b 7.5	a10.6	a 7.6	4.10	b .05	5.20
5	.....	a42.0	7.5	a10.2	a 7.6	b 3.70	b .07	b 1.20
6	.....	61.0	7.5	a 9.8	a6.8	3.30	b .07	.08
7	.....	39.0	7.5	a 9.4	a 6.2	b 3.70	b .08	b .06
8	.....	34.0	7.3	a 8.2	a 6.0	4.10	b .08	.04
9	.....	34.0	a 6.5	a 7.5	a 5.6	2.50	b .10	b .02
10	.....	34.0	a 6.2	a 6.8	a 5.4	b 2.60	.10	.01
11	.....	17.1	a 5.0	a 6.2	5.2	b 2.90	b .11	b .02
12	.....	14.9	a 3.2	5.8	5.2	3.00	b .12	b .06
13	.....	13.8	a 2.4	a 5.7	4.9	2.60	b .14	b .08
14	.....	12.3	a 2.2	a 5.5	4.3	2.60	b 1.30	b .14
15	.....	10.6	a 5.4	a 5.4	3.0	b 2.60	b .95	b .20
16	.....	10.6	a10.2	a 4.8	b 4.1	2.60	b .68	b .40
17	.....	10.6	a 9.4	a 4.6	b 5.0	b 2.60	b .54	b .60
18	.....	9.8	a 9.4	a 4.8	6.2	2.50	b .57	b .90
19	.....	9.4	a 8.6	a 5.2	7.7	b 2.20	b .42	1.33
20	.....	8.5	a 8.2	a 4.8	9.4	b 1.90	b .35	a 1.02
21	.....	9.4	a 7.6	a 4.6	b 8.8	b 1.54	b .22	a .72
22	.....	10.6	a 7.4	a 4.4	7.9	b 1.36	b .15	a .40
23	.....	10.0	a 6.6	a 3.6	b 7.5	b 1.18	b .11	a .28
24	.....	10.0	a 6.0	a 3.0	b 7.1	b 1.00	.08	a .22
25	a40	9.8	a 5.4	a 2.8	6.7	b .88	b .07	a .24
26	a 25	b 9.6	a 70.0	a 5.6	b 6.5	b .76	.07	a .42
27	a 30	9.6	61.0	a 8.4	6.2	b .70	b .05	a .36
28	a 28	11.7	35.0	a10.6	b 5.6	b .64	b .04	a .25
29	a 34	b 9.8	28.0	a10.4	5.2	b .52	b .03	a .18
30	a 30	b 9.4	22.0	a11.6	b 4.8	b .40	b .02	a .22
31	a 28	.....	16.7	.....	4.3	b .34	.....	a .16
1916.								
1	.....	1,000	92	30.0	193.0	7.30	.88	3.0
2	.....	990	84	23.0	63.0	5.50	.76	3.0
3	.....	980	84	21.0	48.0	4.00	.76	3.2
4	.....	900	76	21.0	43.0	4.20	.76	3.4
5	.....	800	76	21.0	26.0	4.20	.76	3.6
6	.....	600	68	21.0	23.0	4.00	.64	4.4
7	.....	700	60	21.0	18.0	3.80	.64	5.2
8	.....	700	52	20.0	16.0	3.80	.64	5.8
9	.....	700	52	20.0	14.0	3.60	1.00	5.8
10	.....	802	52	19.3	13.6	3.80	1.60	5.8
11	.....	838	40	18.0	17.6	4.00	2.20	5.8
12	.....	802	40	16.4	14.0	3.40	3.40	5.8
13	.....	694	40	16.4	12.2	3.20	3.80	5.8
14	.....	658	46	16.4	11.1	3.00	4.00	4.7
15	.....	622	46	13.6	8.8	2.60	3.80	4.0
16	.....	442	40	13.3	7.9	2.20	3.60	3.4
17	.....	338	34	13.3	7.3	2.10	3.40	3.4
18	.....	306	30	12.6	6.7	1.76	3.00	3.4
19	.....	c 352	22	11.5	6.4	1.48	2.40	3.4
20	c 50	192	18	10.1	8.4	1.48	2.10	3.6
21	60	140	14	12.2	6.1	1.48	1.60	3.6
22	100	140	22	14.0	6.1	1.24	1.76	3.8
23	160	120	22	20.0	6.1	1.00	1.92	4.0
24	160	110	18	21.0	4.7	1.00	2.10	3.8
25	300	120	43	21.0	3.6	1.00	2.20	3.8
26	400	120	147	21.0	3.8	1.00	2.40	3.6
27	700	130	81	22.0	4.0	1.36	2.80	3.6
28	700	110	44	17.6	4.2	1.12	2.80	3.8
29	800	110	41	198.0	4.4	.88	3.00	3.8
30	1,000	100	39	222.0	8.5	.76	3.00	3.8
31	1,000	.....	34	.....	11.5	.76	.....	3.6

a Estimated. b Interpolated. c Actual measurement of Horse and Rock creeks.

Daily discharge, in second-feet, of Rock Creek near Barnard, Mont., 1914–1917—Contd.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1917.							1917.						
1	.....	12.1	4.40	0.16	0	2.20	16	.....	20.0	1.64	0.08	2.90	.....
2	.....	12.6	3.60	.08	0	2.20	17	21.0	18.4	1.50	.16	4.40	.....
3	.....	12.6	2.70	0	0	2.20	18	21.0	16.8	1.36	0	6.60	.....
4	.....	15.1	2.70	0	0	2.20	19	19.5	15.7	1.22	0	5.60	.....
5	.....	16.2	5.60	0	0	2.20	20	18.4	14.6	1.22	0	4.40	.....
6	.....	16.2	5.60	0	0	.....	21	17.3	12.6	1.08	0	3.60	.....
7	.....	15.7	7.10	0.08	0	.....	22	15.7	12.1	1.08	0	2.90	.....
8	.....	15.1	5.10	.08	0	.....	23	15.1	11.1	1.08	0	2.10	.....
9	.....	14.6	2.70	.08	0.08	.....	24	14.1	10.6	.80	0	2.10	.....
10	.....	21.0	1.78	.08	.16	.....	25	13.1	7.6	.72	0	2.10	.....
11	.....	21.0	2.40	.08	.16	.....	26	12.6	6.6	.64	0	1.92	.....
12	.....	21.0	1.78	.08	.24	.....	27	12.6	6.6	.56	0	1.92	.....
13	.....	21.0	1.92	.08	.24	.....	28	12.1	6.1	.56	0	2.10	.....
14	.....	21.0	2.20	.08	1.08	.....	29	11.6	5.6	.48	0	2.10	.....
15	.....	21.0	1.92	.08	1.92	.....	30	11.6	5.6	.40	0	2.10	.....
							31	11.6	.....	.32	0	.....	.....

NOTE.—1914: Sluice gate closed May 28 to June 8 and July 19 to Aug. 3; sluice opened Aug. 4. Dam broken from June 9 to July 2.

1915: Shifting control Sept. 5 to Oct. 19.

1916: Stage-discharge relation affected by ice Mar. 20 to Apr. 9. Discharge estimated Mar. 20 to May 23; no observer; data available very meager. May 24, new station established below junction with Horse Creek.

1917: Spring break up took place about Apr. 8 and there was considerable run-off, but no records were obtained until May 17. Stage-discharge relation affected by ice Oct. 6–31; data inadequate for determination of daily discharge. No flow Aug. 3–6 and Aug. 19 to Sept. 8.

Monthly discharge of Rock Creek near Barnard, Mont., 1914–1917.

[Drainage area, 298 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1914.						
May	11.4	0	8.90	0.030	0.035	547
June	21.0	0	7.50	.025	.028	446
July	47.0	0	7.40	.025	.029	455
August	22.0	0	4.40	.015	.017	271
September	2.5	.5	.81	.003	.003	48
October	67.0	.5	8.30	.028	.032	510
The period	.....	.....	.....	.....	.144	2,277
1915.						
March 24–31	40.0	24.00	30.00	.101	.030	476
April	61.0	8.50	20.00	.067	.075	1,190
May	70.0	2.20	13.00	.044	.051	799
June	14.9	2.80	7.30	.024	.027	434
July	10.4	3.00	6.40	.022	.025	394
August	4.3	.34	2.30	.008	.009	141
September	1.3	.02	.24	.001	.001	14
October	5.2	.01	.48	.002	.002	12
The period	.....	.....	.....	.....	.220	3,479
1916.						
March 20–31	1,000.0	50.00	452.00	1.516	.669	10,758
April	1,000.0	100.00	437.00	1.634	1.823	28,979
May	147.0	14.00	50.00	.168	.194	3,074
June	222.0	10.10	31.00	.104	.116	1,845
July	193.0	3.60	20.00	.067	.077	1,230
August	7.3	.76	2.60	.009	.010	160
September	4.0	.64	2.10	.007	.008	125
October	5.8	3.00	4.10	.014	.016	252
The period	.....	.....	.....	.....	2.913	46,423
1917.						
May 17–31	21.0	11.60	15.20	.051	.028	452
June	21.0	5.60	14.20	.048	.054	845
July	7.1	.32	2.10	.007	.008	129
August	.16	0	.04	.000	.000	2
September	6.60	0	1.69	.006	.007	100
October	.....	.....	[a] 2.005	.007	.008	123
The period	.....	.....	.....	.....	.105	1,651

[a] Estimated.

Mean monthly discharge, in second-feet, of Rock Creek near Barnard, Mont., 1914–1917.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Total in acre-feet.
1914	.....	.....	8.9	7.5	7.4	4.40	0.81	8.30	[a] 2,277
1915	[a] 30	20	13.0	7.3	6.4	2.30	.24	.48	3,479
1916	[a] 452	487	50.0	31.0	20.0	2.60	2.10	4.10	46,423
1917	.....	.....	[a] 15.2	14.2	2.1	.04	1.69	2.00	[a] 1,651
Average	[b]	254	24	15	9	2.3	1.22	3.7	24,951
Average run-off, acre-feet	.....	15,114	1,476	893	553	141	73	228	18,478
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	62

[a] Partial record not included in average.
[b] Average not included, as only record, March, 1916, represents abnormal conditions.

ROCK CREEK NEAR HINSDALE, MONT.

LOCATION.—In sec. 10, T. 31 N., R. 36 E., at Ottenstror's ranch, about 2 miles below head gates of Rock Creek canal, and 6 miles northeast of Hinsdale, in Valley County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 19, 1912, to December 31, 1917. From July 5, 1905, to December 31, 1907, data were obtained at a station 2 miles upstream, just below diversion dam of Rock Creek canal. Flow at these two points is practically the same.

GAGE.—Combined overhanging chain and staff gage on the left bank back of John Ottenstror's house. Chain gage reads to 16.0 feet and staff 16.0 to 24 feet. Original chain gage washed out during spring flood of 1917, and new one installed 30 feet above old site is now in use.

DISCHARGE MEASUREMENTS.—Made by wading one-fourth mile below the gage at low and medium stages, and from a bridge 2 miles below at high stages.

CHANNEL AND CONTROL.—The water at the gage is deep and sluggish at low stages. The control is a gravel bar one-fourth mile below. Under natural conditions it shifts a little during high water. The left bank is high and does not overflow at the gage. The right bank is fairly high, but overflows at flood stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 18.40 feet June 9, 1906, determined by leveling from flood marks (approximate discharge determined from extension of rating curve, 6,220 second-feet); minimum stage recorded, no flow April 14 to May 2, May 9–24, and after July 12, 1906; after September 28, 1907; April 23–25, 27, 28, 30, May 1, 2, 4, 1913; May, 3, 5, 8, 10, 13, 1915; after September 13, 1917.

ICE.—Stage-discharge relation seriously affected by ice. Observations discontinued during winter months.

DIVERSIONS.—There is no storage, but the normal summer flow is diverted above the gage during the irrigation season.

REGULATION.—None.

ACCURACY.—Stage-discharge relation likely to change during floods but permanent at low stages. A beaver dam on the control affected the stage discharge relation from August 10, 1915, to the time of the spring flood in 1916. The gage readings at this station have been good. Records good.

Discharge measurements of Rock Creek near Hinsdale, Mont., 1906–7 and 1912–1917.

Date.	Made by—	Gage height.	Discharge.
1906.		*Feet.*	*Sec.-ft.*
July 21	W. B. Freeman	1.38	0.5
1907.			
Apr. 16	J. B. Pierson	7.26	1,310
23	do	13.07	3,670
25	do	6.93	1,390
May 21	do	4.83	664
28	do	3.35	219
June 17	do	3.10	217
July 9	do	1.84	30.6
31	do	1.36	1.0
Aug. 21	do	.....	.0
Oct. 21	Robert Follansbee	1.40	1.5
1912.			
Apr. 19	B. E. Jones	8.90	727
26	do	6.80	158
May 4	do	6.45	87
25	R. R. Randell	6.21	59
June 18	do	6.64	117
July 29	do	5.80	12.6
Aug. 31	do	5.89	21
Nov. 14	do	5.74	11.7
1913.			
Mar. 24	R. R. Randell	6.09	16.0
Apr. 17	J. B. Stewart	6.25	51
May 6	do	5.40	.85
23	do	5.65	4.5
June 19	do	6.25	44
Aug. 1	do	5.85	12.6
1914.			
May 6	B. E. Jones	5.66	6.4
June 4	do	5.39	.43
17	do	6.05	41
1915.			
Apr. 9	B. E. Jones	6.62	126
May 6	do	5.58	.8
17	do	6.36	60
29	do	8.01	402
June 25	do	6.14	28
July 30	do	6.27	46.4
Aug. 21	W. A. Lamb	6.14	2.0
Nov. 21	do	6.70	3.7
1916.			
Apr. 12	A. H. Tuttle	18.95	3,670
30	do	6.06	90
May 18	do	5.50	10.2
29	do	6.50	175
June 19	do	5.74	24.0
July 25	do	5.65	13.3
Aug. 21	do	5.55	7.4
1917.			
Apr. 28	M. D. Anderson	7.20	248
May 17	A. H. Tuttle	6.00	59
30	do	5.50	5.4
June 13	do	5.87	23.0
Nov. 16	Lamb and Jones	5.30	2.0

NOTE.—1906: July 21, discharge estimated.

1907: Apr. 16 and 23, June 17, July 9, canal heading just above station, dry. Apr. 25, large flow in canal, not measured. May 21, canal discharge, 326 second-feet. May 28, canal discharge, 284 second-feet. July 31 and Oct. 21, discharge estimated.
1912: Nov. 14, ice at the gage, but not at the control.
1913: Mar. 24, ice present.
1915: Nov. 21, stage-discharge relation affected by beaver dam and ice on control.

Daily discharge, in second-feet, of Rock Creek near Hinsdale, Mont., 1906–7 and 1912–1917.

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1906.					1906.				
1	0.5	0.0	616	77	17	.....	0.0	925	.....
2	.5	.0	287	77	18	.....	.0	659	.....
3	.5	.5	116	77	19	.....	.0	385	.....
4	.5	2	77	65	20	.....	.0	102	.....
5	.5	7	27	54					
					21	.....	.0	27	.....
6	2	7	2	35	22	.....	.0	7	.....
7	16	7	2,750	27	23	.....	.0	102	.....
8	2	7	6,220	27	24	.....	.0	102	.....
9	.5	.0	.....	20	25	.....	1,540	131	.....
10	.5	.0	1,360	2					
					26	.....	2,420	89	.....
11	.5	.0	.....	2	27	.....	630	89	.....
12	.5	.0	.....	.....	28	.....	264	89	.....
13	.5	.0	2,880	.....	29	.....	411	77	.....
14	.....	.0	2,080	.....	30	.....	2,150	77	.....
15	.....	.0	1,400	.....	31	.....	3,080	.....	.....
16	.....	.0	1,110	.....					

Daily discharge, in second-feet, of Rock Creek near Hinsdale, Mont., 1906–7 and 1912–1917—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1907.							1907.						
1	102	1,110	147	65	0.5	201	17	895	601	385	7	0.5	0.5
2	517	1,080	89	65	.5	164	18	688	630	221	7	.5	.5
3	717	1,080	77	65	.5	164	19	688	630	335	7	2	.5
4	490	1,050	221	65	.5	147	20	1,460	630	102	2	2	.5
5	955	985	147	65	.5	65	21	2,230	630	89	2	2	.5
6	1,080	985	116	65	.5	7	22	3,160	688	77	2	2	.5
7	2,190	955	102	65	.5	2	23	2,840	805	77	2	2	.5
8	1,870	925	89	65	.5	2	24	2,500	1,020	77	2	2	.5
9	1,970	925	89	54	.5	2	25	1,870	1,530	77	2	2	.5
10	3,360	865	89	54	.5	2	26	1,400	1,050	77	2	2	.5
11	5,520	835	89	44	.5	2	27	1,400	895	77	2	2	.5
12	5,520	835	89	35	.5	2	28	1,270	775	77	2	2	.5
13	3,180	775	77	35	.5	2	29	1,200	659	77	.5	2	0
14	3,400	805	77	27	.5	2	30	1,140	517	65	.5	2	0
15	2,150	688	630	27	.5	2	31	.....	201	.....	.5	89	.....
16	1,380	630	573	20	.5	.5							

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1912.								
1	.....	96	.....	46	10	20	10	12
2	.....	88	.....	59	10	20	12	12
3	.....	88	.....	46	10	17	14	12
4	.....	88	.....	73	10	14	12	12
5	.....	105	.....	205	10	52	12	12
6	.....	1,270	.....	162	10	216	12	12
7	.....	1,750	.....	162	10	35	12	12
8	.....	895	.....	52	10	20	14	10
9	.....	392	.....	50	10	20	12	12
10	.....	420	.....	364	10	25	12	12
11	.....	228	.....	132	8	25	12	12
12	.....	194	.....	80	10	20	12	12
13	.....	162	.....	52	10	20	14	12
14	.....	123	.....	40	1	20	12	12
15	.....	105	.....	38	2	14	12	12
16	.....	80	.....	20	2	12	12	.....
17	.....	73	.....	25	2	14	14	.....
18	.....	52	.....	17	14	12	13	.....
19	740	52	114	14	540	12	13	.....
20	540	46	88	7	2,400	14	12	.....
21	392	40	66	20	406	12	12	.....
22	312	40	66	12	152	14	12	.....
23	240	88	52	14	132	14	12	.....
24	194	66	40	15	66	10	12	.....
25	172	52	40	20	52	10	13	.....
26	152	40	35	17	35	8	13	.....
27	142	132	38	19	30	10	12	.....
28	132	.....	30	12	20	8	12	.....
29	132	.....	30	10	20	8	12	.....
30	114	.....	35	10	17	10	12	.....
31	.....	.....	.....	10	17	.....	12	.....

Daily discharge, in second-feet, of Rock Creek near Hinsdale, Mont., 1906–7 and 1912–1917—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1913.								
1	2,200	0	1.0	87	12	3.0	8.0	.....
2	1,220	0	1.0	180	12	2.0	8.0	.....
3	935	.5	1.5	169	12	2.0	10	.....
4	410	0	2.0	138	10	2.0	15	.....
5	335	.5	2.5	246	8.0	2.0	15	.....
6	262	1.0	2.0	246	6.0	2.0	18	.....
7	136	1.0	2.0	246	6.0	2.0	15	.....
8	146	1.0	2.5	138	6.0	2.0	10	.....
9	136	1.0	2.5	38	6.0	2.0	10	.....
10	127	1.0	2.5	60	6.0	2.0	10	.....
11	100	1.0	2.5	48	6.0	2.0	10	.....
12	84	4.5	2.5	38	6.0	2.0	10	.....
13	76	1.0	2.5	43	6.0	2.0	10	.....
14	84	1.0	2.5	34	6.0	3.0	10	.....
15	76	1.5	2.5	26	6.0	3.0	10	.....
16	84	2.0	2.5	26	14	3.0	10	.....
17	35	15	3.0	26	22	3.0	15	.....
18	18	2.5	3.0	26	18	3.0	15	.....
19	4.5	2.0	43	18	10	3.0	15	.....
20	2.0	1.5	43	15	8.0	3.0	15	.....
21	.5	8.0	26	12	8.0	3.0	15	.....
22	1.0	3.0	87	15	6.0	3.0	15	.....
23	0	4.5	129	18	10	3.0	12	.....
24	0	3.0	112	18	10	3.0	12	.....
25	0	1.5	60	18	8.0	3.0	15	.....
26	.5	1.5	34	15	6.0	3.0	18	.....
27	0	1.5	34	268	6.0	3.0	18	.....
28	0	1.5	34	48	6.0	3.0	15	.....
29	.5	1.5	54	26	4.5	8.0	15	.....
30	0	1.5	38	18	4.5	8.0	15	.....
31	.....	1.5	.....	12	3.0	.....	15	.....
1914.								
1	540	4	.4	27	27	27	8	18
2	705	6	1.2	14	27	27	8	18
3	815	4	.4	8	8	18	4	11
4	1,100	6	.4	4	1.2	14	8	18
5	450	4	.2	2	2	11	3	11
6	670	6	.4	2	1.2	11	4	14
7	570	8	14	3	2	14	400	14
8	162	6	50	1.2	1.2	11	3,200	8
9	133	2	8	2	1.2	14	855	14
10	69	4	4	1.2	.4	11	351	8
11	76	4	3	510	.4	11	194	14
12	50	6	2	300	1.2	14	142	14
13	27	4	855	50	.4	11	106	8
14	27	6	1,360	56	1.2	22	62	14
15	11	4	264	50	.4	27	44	8
16	27	4	62	27	.4	44	50	14
17	50	2	44	14	1.2	38	32	11
18	27	1.2	18	8	.4	22	22	6
19	32	2	11	8	1,750	22	32	11
20	18	1.2	4	4	228	11	22	6
21	14	1.2	3	3	50	6	32	11
22	27	2	4	2	2,460	8	22	11
23	22	1.2	2	1.2	124	6	14	11
24	27	2	3	2	1,850	8	22	11
25	22	1.2	1.2	1.2	2,170	6	14	11
26	8	1.2	1.2	1.2	300	6	22	11
27	8	2	194	2	252	8	22	11
28	4	1.2	133	1.2	184	6	11	11
29	6	2	98	2	205	8	18	11
30	4	1.2	69	1.2	133	6	11	11
31	.....	1.2	.....	1.2	80	.....	18	.....

Daily discharge, in second-feet, of Rock Creek near Hinsdale, Mont., 1906–7 and 1912–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1915.									
1	.....	510	1	160	49	16	.....	.....	.....
2	.....	670	1	299	28	13	.....	.....	.....
3	.....	1,550	0	440	16	10	.....	.....	.....
4	.....	1,320	1	299	20	13	.....	.....	.....
5	.....	1,140	0	150	16	10	.....	.....	.....
6	.....	570	1	122	20	13	.....	.....	.....
7	.....	364	1	94	16	13	.....	.....	.....
8	.....	152	0	62	8	10	.....	.....	.....
9	.....	98	1	49	8	13	.....	.....	.....
10	.....	44	0	44	6	10	.....	.....	.....
11	.....	50	1	38	8	10	.....	.....	.....
12	.....	22	1	38	8	10	.....	.....	.....
13	.....	6	0	33	6	9	.....	.....	.....
14	.....	6	1	28	28	8	.....	.....	.....
15	.....	3	10	28	94	7	.....	.....	.....
16	.....	4	150	28	211	6	.....	.....	.....
17	.....	3	56	28	400	5	.....	.....	.....
18	.....	2	20	28	835	4	.....	.....	.....
19	.....	4	13	28	348	3	.....	.....	.....
20	.....	2	6	28	180	2	.....	.....	.....
21	.....	4	8	33	122	2	.....	.....	.....
22	.....	4	6	38	62	.....	.....	.....	.....
23	184	2	1	33	33	.....	.....	.....	.....
24	392	4	1	28	33	.....	.....	.....	.....
25	600	2	1,000	28	24	.....	.....	.....	.....
26	450	4	5,750	745	20	.....	.....	.....	.....
27	595	4	6,350	454	20	.....	.....	.....	.....
28	740	2	2,000	222	34	.....	.....	.....	.....
29	775	4	400	62	49	.....	.....	.....	.....
30	450	2	190	44	49	.....	.....	.....	.....
31	450	.....	150	.....	24	.....	.....	.....	.....
1916.									
1	.....	3,790	106	154	1,720	79	7	10	10
2	.....	3,790	144	144	1,040	61	7	10	10
3	.....	3,790	135	106	350	52	7	10	10
4	.....	2,500	116	98	350	25	10	10	10
5	.....	2,000	116	77	350	19	10	10	10
6	.....	1,600	97	77	316	19	10	10	10
7	.....	1,300	88	75	294	19	10	10	10
8	.....	1,050	79	75	250	19	10	19	10
9	.....	1,450	70	74	1,180	19	10	44	10
10	.....	2,300	70	74	1,180	40	10	31	10
11	.....	3,070	62	91	294	61	10	31	10
12	.....	3,790	62	89	118	38	27	19	10
13	.....	4,160	54	77	98	14	44	19	10
14	.....	3,950	54	77	79	10	228	19	10
15	.....	3,600	46	66	70	10	119	19	10
16	.....	2,750	26	65	52	10	10	19	10
17	.....	2,000	16	63	19	10	10	19	10
18	.....	1,050	11	44	372	10	10	19	10
19	.....	860	11	25	206	10	10	19	10
20	1,130	680	11	25	98	8	10	19	10
21	1,750	560	20	31	70	7	10	19	10
22	1,490	440	20	206	31	7	10	10	10
23	1,240	350	20	696	14	6	10	10	10
24	868	280	20	206	10	5	10	10	10
25	600	220	315	173	14	5	10	10	10
26	1,020	180	1,380	140	10	4	10	10	10
27	1,780	160	624	118	10	4	10	10	9
28	2,720	130	397	79	10	4	10	10	9
29	2,780	110	174	1,350	10	4	10	10	9
30	2,850	88	174	2,410	1,300	4	10	10	9
31	3,200	.....	174	.....	610	7	.....	10	9

Daily discharge, in second-feet, of Rock Creek, near Hinsdale, Mont., 1906–7 and 1912–1917—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1917.							16	2,100	61				
1		173	10			2	17	1,200	61	2			
2		162	4	2			18	750					
3		173		2			19	500				2	
4		173				2	20	700					
5		162		2									
							21	900				2	
6		140				2	22	750					
7		162		2		2	23	900	10				
8		162				2	24	1,200	10				
9	3,620	140	347	2			25	900	10	1			
10	3,820	118	232	2									
							26	400	10				
11	3,860	98	184	2			27	288	10	2		2	
12	2,880	79	41			2	28	250	10	2			
13	3,000	79	26	2			29	195	10	2			
14	2,400	79	9				30	184	10	2			
15	2,700	61					31		10				

NOTE.—1906: June 9, 11, 12, no record on account of high water, as observer could not reach gage. Gage height for June 8 obtained by leveling to high-water marks. Practically no flow after July 12.
1907: Practically no flow after Sept. 28.
1912: Gage was washed out May 28 and replaced June 19. A flood also occurred Apr. 1–10, before the gage was installed.
1915: Stage-discharge relation affected by beaver dam on gravel bar below gage after Aug. 10. Discharge Aug. 11–20 estimated. Mean discharge Aug. 22–31 estimated at 2 second-feet.
1916: Apr. 4–10, 15–29, discharge estimated by comparison with records of flow of Battle Creek, Frenchman River, and Poplar and Porcupine creeks.
1917: Apr. 13–26, discharge estimated by comparison with records of flow of Frenchman River and Porcupine Creek. No flow May 18–22, June 3–8, 15–16, 18–24, 26, July 1, 4, 6, 8, 12, 14; no observer July 15 to Aug. 18. No flow Aug. 20, 22–26, 28–31, Sept. 2–3, 5, 9–11; practically no flow after Sept. 12.

Monthly discharge of Rock Creek near Hinsdale, Mont., 1906–7 and 1912–1917.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1906.				
April	16	0	0.83	49
May	3,080	0	340	20,900
June 1–8, 10, 13–30	6,220	2	807	43,200
July 1–12	77	0	38.6	916
The period				65,165
1907.				
April	5,520	102	1,900	113,000
May	1,530	201	832	51,200
June	630	65	150	8,930
July	65	.5	27.6	1,700
August	89	.5	3.49	242
September	201	.0	25.7	1,530
The period				177,000
1912.				
April 19–30	740	114	272	6,470
May 1–27	1,750	40	251	13,400
June 19–30	114	30	52.8	1,260
July	364	10	58.5	3,600
August	2,400	1	130	7,990
September	216	8	23.5	1,400
October	14	10	12.3	756
November 1–15	12	10	11.9	354
The period				35,230
1913.				
April	2,220	0	216	12,900
May	15	0	2.16	133
June	129	1.0	24.5	1,460
July	268	12	74.7	4,590
August	22	3.0	8.32	512
September	8	2.0	2.93	174
October	18	8	13.0	799
The period				20,600

Monthly discharge of Rock Creek near Hinsdale, Mont., 1906–7 and 1912–1917—Contd.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1914.				
April	1,100	4	190	11,300
May	8	1.2	3.25	200
June	1,360	.2	107	6,370
July	510	1.2	35.8	2,200
August	2,460	.4	318	19,600
September	44	6.0	14.9	887
October	3,200	3	186	11,400
November	18	6	11.7	696
The period	.....	.....	.....	52,653
1915.				
March 23–31	775	184	514	9,180
April	1,550	2	218	13,000
May	6,350	0	520	32,000
June	745	28	124	7,380
July	835	6	89.5	5,500
August	16	2	6.7	412
September	.....	.....	2	119
The period	.....	.....	.....	67,600
1916.				
March 20–31	3,200	600	1,790	42,600
April	4,160	88	1,730	103,000
May	1,380	11	151	9,280
June	2,410	25	233	13,900
July	1,720	10	340	20,900
August	79	4	19	1,170
September	228	7	22.3	1,330
October	44	10	15.6	959
November	10	9	9.86	587
The period	.....	.....	.....	194,000
1917.				
April 9–30	3,860	184	1,520	66,300
May	173	0	70.1	4,310
June	347	0	28.8	1,710
July 1–14	2	0	1.14	31.7
August 19–31	2	0	.46	11.9
September	2	0	.40	23.8
The period	.....	.....	.....	72,400

NOTE.—1912: There were two floods in 1912, the highest the first part of April, and a second, not quite so great, in June. No gage heights were obtained for either, and no estimates of daily flow have been prepared.
1915: Stage-discharge relation affected by backwater from a beaver dam during September; and the mean discharge was estimated from daily gage heights, and a discharge measurement Aug. 21.

Mean monthly discharge, in second-feet, of Rock Creek near Hinsdale, Mont., 1906–7 and 1912–1917.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total in acre-feet.
1906	.....	0.83	340	807	38.6	.....	.....	.....	.....	65,100
1907	.....	1,900	832	150	27.6	3.49	25.7	.....	.....	17,700
1912	.....	[a]272	[b]251	[c]52.8	58.5	130	23.5	12.3	[d]11.9	35,200
1913	.....	216	2.16	24.5	74.7	8.32	2.93	13.0	.....	20,600
1914	.....	190	3.25	107	35.8	318	14.9	186	11.7	52,700
1915	[e]514	218	520	124	89.5	[f]6.7	[f]2	.....	.....	67,600
1916	[g]1,790	1,750	151	233	340	19.0	22.3	15.6	9.86	194,000
1917	.....	[h]1,520	70.1	28.8	[i]1.14	[j].46	.40	.....	.....	72,400
Average	.....	825	271	211	83.2	69.4	13.1	.....	.....	85,600
Median	.....	218	201	116	48.6	8.3	14.9	.....	.....	66,400
Maximum	.....	1,900	832	807	340	318	25.7	.....	.....	194,000
Minimum	.....	.83	2.16	24.5	1.14	.46	.40	.....	.....	20,600

[a] Apr. 19–30.
[b] May 1–27.
[c] June 19–30.
[d] Nov. 1–15.
[e] Mar. 23–31.
[f] Aug. 21 to Sept. 30, estimated.
[g] Mar. 20–31.
[h] Apr. 9–30.
[i] July 1—14
[j] Aug. 19–13.

NOTE.—Means for periods less than a full month but exceeding 15 days were considered means for the month in finding average and median flow. Means for July 1–14 and Aug. 19–31, 1917, were considered means for those months. The median flow given was obtained by arranging the monthly means in their order of magnitude and taking the middle mean, or, if their number was even, the average of the two middle means. By using daily discharge a considerably lower median discharge would be obtained.

HORSE CREEK NEAR BARNARD, MONT.

LOCATION.—In NE. ¼ sec. 3, T. 37 N. R. 37 E. Montana principal meridian, near Barnard, Mont., one-quarter mile south of international boundary.

DRAINAGE AREA.—71 square miles.

RECORDS AVAILABLE.—Open-water flow May 1, 1914, to October 31, 1917.

GAGE.—Staff gage fastened to post on left bank; read by W. J. Harris.

DISCHARGE MEASUREMENTS.—Made by wading near gage at all stages.

CHANNEL AND CONTROL.—Bed of channel clay. Banks steep and subject to overflow. One channel at all stages. Control, gravel ford; practically permanent.

EXTREMES OF DISCHARGE.—1914–1917: Maximum stage recorded April 10, 1916 (discharge estimated at 364 second-feet); no flow during periods 1914, 1915, and 1917.

ICE.—Stage-discharge relation affected by ice during period of spring run-off. Station discontinued during winter.

ACCURACY.—Stage-discharge relation permanent except during spring break-up. Gage read daily to hundredths. No measurements ever taken above stage 2.43 feet (Apr. 19, 1916). Records from April 1,to April 22 1916, roughly approximate, partly because of ice conditions and partly because of lack of measure ments at the higher stages. Records fair.

Discharge measurements of Horse Creek near Barnard, Mont., 1914–1916.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
May 1	E. W. W. Hughes	0.64	0.63	Apr. 19	J. E. Caughey	2.43	40.00
June 30	do	.50	[a] .28	May 24	do	.53	1.70
July 1	do	.45	[a] .22	June 24	do	.54	1.15
				Aug. 12	L. B. P. Miles	.38	[a] .10
1915.				Sept. 14	do	.28	[a] .03
Apr. 24	F. R. Steinberger	.44	.336	Nov. 29[b]	do	.33	[a] .07
June 12	do	.44	.351	22[b]	do	[c] .68	[a] .06
July 15	do	.30	0				
Aug. 9	do	.00	0	1917.			
Sept. 4	do	.00	0	May 18	P. A. Fetterley	.80	2.14
Oct. 19	do	.24	0	July 13	do	.55	.03
				Aug. 17	do		0
				Oct. 18	do	.70	0.01

[a] Discharge determined by using a 24-inch weir.
[b] Ice present.
[c] Staff gage located at new section 65 feet upstream.

Daily discharge, in second-feet, of Horse Creek near Barnard, Mont., 1914–1917.

Day.	May.	June.	July.	Day.	May.	June.	July.	Day.	May.	June.	July.
1914				1914.				1914.			
1	0.69	0.14	0.23	11	0.37	0.31	0.07	21	0.29	0.33	0
2	.57	.14	.23	12	.37	.73	.06	22	.26	.33	0
3	.37	.14	.23	13	.35	.73	.06	23	.26	.29	0
4	.23	.14	.21	14	.33	.73	.14	24	.26	.29	0
5	.33	.41	.20	15	.33	.73	0	25	.26	.37	0
6	.35	.41	.17	16	.31	.66	0	26	.23	.41	0
7	.35	.39	.14	17	.31	.49	0	27	.20	.41	0
8	.46	.37	.11	18	.37	.41	0	28	.20	.51	0
9	.33	.37	.09	19	.44	.37	0	29	.17	[a] .39	0
10	.33	.33	.08	20	.33	.37	0	30	.17	.29	0
								31	.14		

[a] Interpolated.

Daily discharge, in second-feet, of Horse Creek near Barnard, Mont., 1914–1917—Con.

Day.	Mar.	Apr.	May	June.	July.	Aug.	Sept.	Oct.
1915.								
1	.....	14.00	0	0.64	0.82	.....	0	0
2	.....	87.00	0	.64	.76	.....	0	0
3	.....	135.00	0	.64	.64	.....	0	0
4	.....	207.00	0	.58	.40	.....	0	0
5	.....	167.00	0	1.20	.36	.....	0	0
6	.....	135.00	0	1.30	.24	.....	0	0
7	.....	127.00	0	1.10	.20	.....	0	0
8	.....	103.00	0	.94	.20	.....	0	0
9	.....	87.00	0	.94	.20	.....	0	0.08
10	.....	87.00	0	.88	.20	.....	0	.08
11	.....	51.00	0	.76	.16	.....	0	.16
12	.....	24.00	0	.64	.16	.....	0	.16
13	.....	13.40	0	.64	.12	.....	0	.20
14	.....	7.00	1.00	64	.12	.....	0	.20
15	.....	5.00	2.00	.64	.12	.....	0.04	.20
16	.....	2.80	.70	.64	.12	.....	0	.20
17	.....	1.80	.70	.64	0	.....	0	.20
18	.....	1.80	.64	.64	0	.....	0	.20
19	.....	2.30	.64	.64	0	.....	.08	.20
20	.....	1.80	.52	.64	0	.....	.20	.16
21	.....	1.40	.52	.64	0	.....	.28	.12
22	.....	1.20	.52	.70	.20	.....	.40	.08
23	.....	.88	.52	.70	.20	.....	.70	0
24	.....	.64	.52	.70	.16	.....	.40	0
25	.....	.40	8.40	.70	.00	.....	.40	0
26	.....	.20	71.00	.70	0	.....	.20	0
27	.....	.16	51.00	.76	0	.....	0	0
28	1.00	.12	24.00	.76	0	.....	0	0
29	1.00	.24	8.40	.76	0	.....	0	0
30	8.40	.12	36.00	.76	0	.....	0	0
31	8.40	.....	1.00	.....	0	.....	.....	0
1916.								
1	.....	200.0	5.30	4.50	23.00	.96	.04	.05
2	.....	200.0	4.50	4.20	12.30	.66	.05	.05
3	.....	259.0	4.30	3.70	6.10	.66	.05	.05
4	.....	260.0	3.40	3.30	4.80	.60	.05	.06
5	.....	240.0	2.80	3.00	2.70	.60	.05	.06
6	.....	290.0	2.40	2.70	2.00	.55	.05	.07
7	.....	320.0	2.20	2.40	1.28	.55	.06	.06
8	.....	340.0	2.20	2.30	.90	.50	.06	.06
9	.....	360.0	2.20	2.20	.60	50	.07	.05
10	.....	364.0	2.10	2.20	.55	.45	.10	.05
11	.....	340.0	2.00	2.00	.55	.45	.20	.05
12	.....	304.0	1.92	1.84	1.20	.50	.25	.04
13	.....	184.0	1.84	1.68	1.60	.45	a .16	.05
14	.....	160.0	1.76	1.52	1.36	.40	.08	.05
15	.....	124.0	1.76	1.36	1.20	.35	.10	.06
16	.....	124.0	1.76	1.20	1.02	.35	.09	.05
17	.....	88.0	1.68	1.20	.90	.40	.08	.05
18	.....	66.0	1.60	1.20	.78	.35	.07	.06
19	.....	40.0	1.68	1.14	.72	.30	.06	.06
20	.....	37.0	1.52	.84	.66	.25	.05	.07
21	.....	34.0	1.52	1.14	.66	.20	.05	.06
22	.....	26.0	1.36	1.20	.66	.15	.05	.07
23	.....	25.0	1.36	1.52	.60	.10	.05	.07
24	.....	23.0	1.70	1.52	.60	.09	.05	.08
25	.....	22.0	a 2.00	1.44	.55	.08	.04	.08
26	10.0	21.0	94.00	1.44	.55	.07	.04	.09
27	20.0	16.2	66.00	1.36	.50	.06	.04	.09
28	50.0	10.5	12.30	1.60	.50	.05	.05	.10
29	120.0	8.8	7.40	2.80	1.20	.05	.04	.09
30	140.0	6.1	5.40	12.70	1.44	.04	.05	.10
31	160.0	.....	4.80	.....	1.20	.04	.....	.10

a Estimated.

Daily discharge, in second-feet, of Horse Creek near Barnard, Mont., 1914–1917—Con.

Day.	Apr.	May	June.	July.	Sept.	Oct.	Day.	Apr.	May.	June.	July.	Sept.	Oct.
1917.							1917.						
1	0.0	17.00	0.05	0.01	0	0.04	16	192.0	2.10	0.05	0.01	0.04	0.05
2	0	15.00	.05	.01	0	.05	17	146.0	2.10	.05	.01	.04	.05
3	0	13.00	.46	.01	0	.05	18	99.0	2.10	.05	.01	.04	.05
4	0	11.10	.05	.01	0	.05	19	52.0	1.90	.05	0	.04	.05
5	0	9.20	.05	.01	0	.05	20	49.0	1.90	.05	0	.05	.04
6	0	6.40	.04	.01	0	.05	21	46.0	1.69	.05	0	.05	.04
7	a 1.0	5.50	.04	.01	0	.05	22	43.0	1.28	.04	0	.05	.04
8	a 5.0	3.60	.04	.01	0	.05	23	40.0	1.08	.04	0	.05	.04
9	a 25.0	2.10	.04	.01	0	.05	24	36.0	1.08	.04	0	.05	.04
10	a 50.0	2.10	.05	.01	0	.05	25	32.0	1.08	.03	0	.05	.04
11	a 70.0	2.10	.05	.01	0	.05	26	27.0	1.08	.03	0	.05	.04
12	92.0	2.10	.05	.01	.04	.05	27	25.0	1.28	.02	0	.05	.04
13	141.0	2.10	.05	.01	.04	.05	28	23.0	.66	.02	0	.05	.04
14	183.0	2.10	.05	.01	.04	.05	29	21.0	.46	.02	0	.05	.04
15	239.0	2.10	.05	.01	.04	.05	30	19.0	.05	.02	0	.04	.04
							31	-------	.05	------	0	------	.04

a Estimated.

NOTE.—1914: Stream dry July 15 to Oct. 31.
1915: No flow for following periods: May 1–13, July 17–21, July 27 to Sept. 14, Sept. 16–18, Sept. 27 to Oct 8, and Oct. 23–31.
1916: Gage out Mar. 30 to Apr. 18; discharge Mar. 26 to Apr. 18 estimated from field inspection.
1917: Stage-discharge relation affected by ice Apr. 1–11; discharge Apr. 7–11 estimated. No measurements at high-water stages; records for April roughly approximate. No flow July 19 to Sept. 11.

Monthly discharge of Horse Creek near Barnard, Mont., 1914–1917.

[Drainage area, 71 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1914.						
May	0.69	0.14	0.32	0.0045	0.005	20
June	1.66	.14	.43	.0061	.007	26
July	.23	.00	.06	.0009	.001	4
The period					.013	50
1915.						
March 28–31	8.40	1.00	4.70	.0660	.070	34
April	207.00	.12	42.00	.5920	.660	2,499
May	71.00	.00	6.70	.0940	.180	412
June	1.30	.58	.75	.0110	.011	45
July	.82	0	.17	.0024	.003	12
August	0	0	0	0	0	0
September	.70	0	.09	.0013	.001	5
October	.20	0	.07	.0010	.001	4
The period					.854	3,011
1916.						
March 26–31	160.00	10.00	83.00	1.170	.26	988
April	364.00	6.10	149.00	2.100	2.34	8,866
May	94.00	1.36	8.00	.133	.13	492
June	12.70	.84	2.40	.034	.04	143
July	23.00	.50	2.30	.032	.04	141
August	.96	.04	.35	.005	.01	22
September	.25	.04	.07	.001	.00	4
October	.10	.04	.06	.001	.00	4
The period					2.82	10,660
1917.						
April	239.00	0	55.00	.775	.860	3,273
May	17.00	.05	3.70	.520	.060	228
June	.46	.02	.06	.001	.001	4
July	.01	0	.01	0	0	0
September	.05	0	.03	.001	.001	2
October	.05	.04	.05	.001	.001	3
The period					.923	3,510

Mean monthly discharge, in second-feet, of Horse Creek at Barnard, Mont., 1914–1917.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Total in acre-feet.
1914	.....	.....	0.32	0.43	0.06	0	0	0	*a 50*
1915	*a 4.70*	42	6.70	.75	.17	0	.09	.07	3,011
1916	*a 83.00*	149	8.00	2.40	2.30	.35	.07	.06	10,660
1917	.....	55	3.70	.06	.01	0	.03	.05	3,510
Average	.....	82	4.7	.91	.64	.09	.05	.04	5,727
Average run-off, acre-feet	.....	4,879	289	54	39	6	3	2	5,272
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	74

a Incomplete record not included in average.

McEACHRAN CREEK AT McCOY'S RANCH, SASK.

LOCATION.—In SW. ¼ sec. 6, T. 1, R. 7 W. third meridian, 50 feet north of McCoy's house.

DRAINAGE AREA.—107 square miles.

RECORDS AVAILABLE.—Open-water flow, May 1, 1914, to October 31, 1917.

GAGE.—Vertical staff; read by Donald McCoy.

DISCHARGE MEASUREMENTS.—Made with current meter or with weir.

CHANNEL AND CONTROL.—Banks steep and not subject to overflow. Control consists of gravel; permanent.

EXTREMES OF DISCHARGE.—1914–1917: Maximum stage recorded, 4.74 feet, April 2, 1916; discharge, 956 second-feet; no flow at various periods.

ICE.—Station not maintained during winter. Stage-discharge relation affected by ice April 8–13, 1917.

ACCURACY.—Stage-discharge relation practically permanent, except during break-up periods, when it is affected by ice. Gage read once daily. Daily discharge obtained by applying daily gage height to rating table. Records fair.

Discharge measurements of McEachran Creek at McCoy's ranch, Sask., 1914–1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
May 1	E. W. W. Hughes	0.60	*a* 0.54	1916.			
June 30	do	.29	.....	May 25	J.E.Caughey	2.20	70.00
July 1.	do	.28	.....	26	do	3.00	265.00
				June 23	do	.78	1.45
1915.				Aug. 12	L. B. P. Miles	.30	*a* .04
Apr. 23	F. R. Steinberger	.50	*a* .35	Sept. 13	do	.19	.0
June 11	do	.92	2.40	Nov. 20	do	Dry.	.0
July 14	do	.41	*a* .11	23	do	.do..	.0
17	do	.45	*a* .28				
Sept. 4	do	Dry.	.0	1917.			
Oct. 19	do	...do..	.0	May 18	P. A. Fetterley	.91	3.6
				July 12	do	Dry.	.0
1916.				Aug 16	do	.do..	.0
Apr. 20	J. E. Caughey	1.85	52.00	Oct. 18	do	.do..	.0

a Discharge determined by using a 24-inch weir.

Daily discharge, in second-feet, of McEachran Creek at McCoy's ranch, Sask., 1914-1917.

Day.	May.	June.	July.	Day.	May.	June.	July.	Day.	May.	June.	July.
1914.				1914.				1914.			
1	0.54	0.01	0.02	11	0.24	0.02	0	21	0.13	0.04	0
2	.54	.01	.02	12	.24	.04	0	22	.13	.02	0
3	.54	.01	.01	13	.24	.08	0	23	.13	.02	0
4	.37	.03	.01	14	.24	.08	0	24	.08	.02	0
5	.37	.04	.01	15	.24	.08	0	25	.08	.02	0
6	.24	.04	.01	16	.13	.08	0	26	.04	.02	0
7	.24	.04	.01	17	.13	.04	0	27	.04	.02	0
8	.24	.02	.01	18	.13	.04	0	28	.02	.02	0
9	.24	.02	.01	19	.13	.04	0	29	.02	.02	0
10	.24	.02	0	20	.13	.04	0	30	.01	.02	0
								31	.01	.....	0

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Day.	Mar.	Apr.	May.	June.	July.	Aug.
1915.							1915.						
1	.....	8.60	0.08	4.10	1.51	0.02	16	.....	1.35	0.53	0.74	0.27	0.02
2	.....	10.00	.08	4.10	1.08	.02	17	.....	1.08	.33	.65	.27	.02
3	.....	13.60	.08	4.10	.86	.02	18	.....	.86	.22	.65	.24	.02
4	.....	15.30	.08	4.10	.74	.02	19	.....	.86	.22	.65	.22	.02
5	.....	12.30	.06	4.10	.65	.02	20	.....	.65	.13	.65	.14	.02
6	.....	8.00	.04	4.50	.59	.02	21	.....	.50	.13	.59	.10	.02
7	.....	6.60	.04	4.30	.41	.02	22	.....	.50	.13	.50	.09	.02
8	.....	4.90	.03	3.80	.35	.02	23	.....	.44	.13	.50	.08	.02
9	.....	4.60	.01	3.10	.35	.02	24	5.6	.35	.13	.50	.06	.02
10	.....	4.60	.01	1.94	.35	.02	25	13.0	.35	.22	.41	.04	.02
11	.....	3.60	0	1.51	.31	.02	26	13.0	.35	27.00	.65	.04	.01
12	.....	2.90	0	1.35	.14	.02	27	12.3	.24	18.60	.50	.04	.01
13	.....	2.60	0	1.08	.07	.02	28	10.6	.24	8.60	.99	.03	.01
14	.....	1.94	.22	1.08	.18	.02	29	10.0	.14	6.20	3.60	.03	.01
15	.....	1.62	.41	.99	.11	.02	30	10.0	.11	5.50	3.60	.03	.....
							31	9.3	.....	4.70	.....	.02	.....

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Day.	Mar.	Apr.	May.	June.	July.	Aug.
1916.							1916.						
1	.....	800.0	16.00	21.0	12.50	0.65	16	.....	116.0	2.00	2.5	29.00	.00
2	.....	956.0	15.60	18.0	12.50	.70	17	.....	73.0	2.00	a2.5	24.00	.00
3	.....	676.0	14.80	13.1	11.60	.65	18	.....	67.0	2.00	2.5	16.00	.00
4	.....	376.0	14.00	11.0	10.40	.55	19	.....	83.0	2.00	2.4	6.50	.00
5	.....	140.0	13.40	8.0	8.00	.47	20	.....	50.0	2.00	2.3	2.80	.00
6	.....	131.0	12.50	6.5	5.00	.26	21	.....	39.0	2.70	2.3	2.50	.00
7	.....	170.0	11.30	5.6	5.00	.26	22	.....	31.0	1.60	2.2	1.80	.00
8	.....	147.0	10.70	5.0	5.00	.14	23	.....	31.0	1.20	2.0	1.00	.00
9	.....	280.0	10.40	3.0	42.00	.06	24	.....	26.0	1.00	2.2	1.00	.00
10	.....	764.0	9.80	3.0	63.00	.00	25	.....	22.0	68.00	7.1	.75	.00
11	.....	884.0	9.20	3.0	58.00	.00	26	.....	19.0	237.00	13.4	.75	.00
12	.....	1,096.0	8.60	2.5	50.00	.00	27	.....	15.6	72.00	9.5	.70	.00
13	.....	576.0	6.50	2.5	41.00	.00	28	100	15.2	34.00	6.5	.70	.00
14	.....	388.0	4.00	2.5	38.00	.00	29	200	15.6	26.00	14.0	.60	.00
15	.....	158.0	2.50	2.5	34.00	.00	30	400	16.0	32.00	14.8	.60	.00
							31	700	.....	24.00	.....	.60	Dry.

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1917.					1917.				
1	.....	28.0	1.00	0.08	16	81	3.6	0.18	0.00
2	.....	15.3	.94	.08	17	94	a3.6	.16	.00
3	.....	9.8	.91	.08	18	61	3.6	.16	.00
4	.....	23.0	.88	.08	19	55	2.1	.14	.00
5	.....	35.0	.82	.06	20	80	2.1	.14	.00
6	.....	33.0	.79	.06	21	205	1.9	.12	.00
7	.....	37.0	.79	.04	22	81	2.0	.10	.00
8	.....	29.0	.76	.04	23	154	1.9	.10	.00
9	.....	27.4	.43	.04	24	162	1.8	.10	.00
10	.....	25.0	.38	.00	25	127	1.8	.10	.00
11	.....	19.5	.36	.00	26	49	1.7	.08	.00
12	.....	12.4	.34	.00	27	41	1.6	.08	.00
13	.....	10.1	.28	.00	28	35	1.5	.08	.00
14	228	9.8	.22	.00	29	31	1.5	.08	.00
15	174	7.0	.18	.00	30	23	1.3	.08	.00
					31		1.1	.....	.00

a Estimated.

NOTE.—1914: No flow July 10 to Oct. 31.
1915: No flow Aug. 30 to Oct. 31.
1916: Stage-discharge relation affected by ice Mar. 28 to Apr. 1; discharge estimated. No flow Aug. 10-31.
1917: Stage-discharge relation affected by ice Apr. 8-13. Data inadequate for determination of discharge. Ice going out Apr. 10-13. No flow July 10 to Oct. 31.

Monthly discharge of McEachran Creek at McCoy's ranch, Sask., 1914–1917.

[Drainage area, 107 square miles.]

Month	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1914.						
May	0.54	0.01	0.200	0.00200	0.00200	12.0
June	.03	.01	0.030	.00030	.00030	2.0
July	.02	.....	.004	.00003	.00003	.2
The period	.....	.....	.....	.....	.00233	14.2
1915.						
March 21–31	13.00	5.60	10.50	.098	.029	167
April	15.30	.11	3.60	.034	.038	214
May	27.00	.00	2.40	.022	.025	147
June	4.50	.41	1.90	.018	.002	113
July	1.51	.02	.30	.003	.003	18
August	.02	.00	.02	.001	.001	1
The period	.....	.....	.....	.....	.098	660
1916.						
March 28–31	700.00	100.00	350.00	3.270	.486	2,776.0
April	956.00	15.20	272.00	2.540	2.830	16,185.0
May	237.00	1.00	22.00	.206	.238	1,353.0
June	21.00	2.00	6.40	.060	.067	381.0
July	63.00	.60	15.70	.147	.170	965.0
August	.70	.00	.12	.001	.001	7.0
The period	.....	.....	.....	.....	3.792	21,667.0
1917.						
April 14–30	262.00	23.00	105.00	.981	.620	3,540
May	37.00	1.10	11.40	.107	.120	701
June	1.00	.08	.36	.003	.003	21
July	.08	.00	.02	.000	.000	1
The period	.....	.....	.....	.....	.74	4,263

Mean monthly discharge, in second-feet, of McEachran Creek at McCoy's ranch, Sask., 1914–1917.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Total in acre-feet.
1914	.....	.....	0.20	0.03	0.004	0	0	0	[a] 11.2
1915	[a] 10.50	3.6	2.40	1.90	.300	0.02	0	0	660.0
1916	[a] 350.00	272.0	22.00	6.40	15.700	.12	0	0	21,667.0
1917	.....	[a] 105.0	11.40	.36	.020	0	0	0	4,263.0
Average	.....	138	9.0	2.17	4.00	.04	0	0	8,863
Average run-off, acre-feet	.....	8,212	553	129	246	2	0	0	9,112
Average run-off per square mile	.....	.....	.....	.....	.....	.....	.....	.....	85

[a] Incomplete record not included in average.

EAST BRANCH OF McEACHRAN CREEK AT McCOY'S RANCH, SASK.

LOCATION.—In NE. ¼ sec. 6, T. 1, R. 7 W. third meridian, at McCoy's ranch, 1 mile above junction with main stream.

DRAINAGE AREA.—48 square miles.

RECORDS AVAILABLE.—Incomplete records May 26 to August 31, 1916, when station was discontinued.

GAGE.—Vertical enamel staff fastened to a post and firmly braced to right bank 100 feet above a ford.

DISCHARGE MEASUREMENTS.—Made by wading at ordinary stages, by weir at low stages; no equipment for flood measurements.

CHANNEL AND CONTROL.—Sandy bed and channel. Banks high and not subject to overflow except in extremely high stages, when left bank might be overflowed. Control is subject to growth of vegetation and may be slightly shifting.

EXTREMES OF DISCHARGE.—Maximum discharge recorded, 138 second-feet May 25; no flow August 11 to August 31, 1916.

ICE.—Station not maintained during winter.

ACCURACY.—Discharge measurements were taken during season of 1916, but curve was not plotted. Record poor.

Discharge measurements of East Branch of McEachran Creek at McCoy's ranch, Sask., 1916.

[Made by J. E. Caughey.]

	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
May 25	(a)	138.00
26	4.14	63.00
June 24	2.59	1.32

a Gage established May 26.

NOTE.—No flow Aug. 11, Sept. 14, and Nov. 23, when station was inspected by L. B. P. Miles.

PORCUPINE CREEK AT NASHUA, MONT.

LOCATION.—In NW. ¼ sec. 31, T. 28 N., R. 42 E., 500 feet above the ford, one-fourth mile above the highway bridge three-eighths of a mile north of Nashua in Valley County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—July 11, 1908, to December 31, 1917.

GAGE.—Vertical staff in three sections nailed to trees on the left bank, one-fourth mile above highway bridge. It is read to tenths twice a day during fluctuating stage and once at other times.

DISCHARGE MEASUREMENTS.—Made by wading near gage or from a bridge one-fourth mile below.

CONTROL.—Bed of the stream is of mud. A slight gravel bar forms the control at low stages but is soon drowned out as the creek rises, and the control is the whole channel below the gage.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 18.0 feet, April 11, 1916, determined by leveling from flood marks (discharge, determined from extension of rating curve, about 2,700 second-feet); minimum stage recorded dry August 18 to September 4, 1909; May 27 to June 7; July 12–29, 1910; June 21 to September 5, 1911; August 1–31, 1913; August 19, 1916; July 12 to September 30, 1917.

ICE.—During winter months discharge very small and observations are discontinued. Stage-discharge relation seriously affected by ice.

DIVERSIONS.—No diversions during the period covered by this report. A United States Reclamation Service canal is practically completed, which will divert the entire flow during the irrigation season.

REGULATION.—A United States Reclamation Service reservoir on the middle fork of the stream will partially regulate flood flow. No storage to December 31, 1917.

ACCURACY.—Stage-discharge relation not permanent. Control affected by growth of vegetation and by leaves in the fall. At high stages the control may shift. At low stages changes are slow and covered by discharge measurements. Gage-height readings are fair. Records are fair.

Discharge measurements of Porcupine Creek at Nashua, Mont., 1908–1917.

Date.	Made by—	Gage height.	Discharge.
1908.		*Feet.*	*Sec.-ft.*
July 12	A. F. Huch	1.70	0.1
1909.			
May 8	W. A. Lamb	2.10	6.9
June 23	do	1.85	1.0
July 15	do	5.85	173
16	do	4.98	110
21	do	2.70	27
1910.			
Mar. 27	Raymond Richards	10.15	490
May 9	M. E. McChristie	2.1	6.8
1911.			
Apr. 19	J. C. Beebe	3.61	14.5
May 16	do	3.20	1.5
June 15	do	3.01	.4
Oct. 8	W. A. Lamb	5.55	82
1912.			
Apr. 17	B. E. Jones	8.44	250
May 30	R. R. Randell	11.70	379
June 20	do	3.74	14.6
21	do	3.71	12.9
July 10	do	3.42	3.7
Sept. 5	do	4.02	23
1913.			
Apr. 16	J. B. Stewart	3.98	24.5
May 11	do	3.57	9.6
26	J. B. Stewart	3.95	21.5
June 21	do	3.35	4.0
July 16	do	3.08	.7
1914.			
Apr. 10	W. A. Lamb	4.79	58
May 22	B. E. Jones	3.20	1.8
June 16	do	6.12	123
July 3	do	4.38	38
Oct. 27	do	3.30	1.3
1915.			
Apr. 10	do	5.05	74
May 28	do	6.97	164
June 24	do	3.66	6.5
July 29	do	3.84	9.7
1916.			
Apr. 8	A. H. Tuttle	14.12	804
28	do	4.80	53
May 17	do	4.02	18.0
June 19	do	3.76	9.1
July 24	do	3.84	12.5
Aug. 20	do	3.21	.6
1917.			
Apr. 18	M. D. Anderson	8.16	260
May 14	A. H. Tuttle	4.27	28.4
29	do	3.68	7.2
June 12	do	3.78	6.6

NOTE.—1908: July 12, discharge estimated.
1909: July 15, discharge measurement made from a raft.
1912: May 30, surface velocities reduced by a coefficient of 0.9 were used.
1917: Discharge given for measurement of June 12 is mean of two measurements at same gage height.

Daily discharge, in second-feet, of Porcupine Creek at Nashua, Mont., 1909–1917.

Day.	Apr.	May.	June.	July.	Aug.	Sept.
1909.						
1	.....	25	4.2	4.2	7.0	0
2	.....	25	4.2	2.8	7.0	0
3	.....	22.0	4.2	2.8	7.0	0
4	.....	19.0	4.2	2.8	7.0	0
5	.....	13.0	4.2	2.8	4.2	.....
6	.....	7.0	4.2	2.8	4.2	.....
7	.....	7.0	4.2	38	4.2	.....
8	.....	7.0	4.2	72	4.2	.....
9	.....	7.0	4.2	76	4.2	.....
10	.....	7.0	4.2	68	2.8	.....
11	.....	7.0	4.2	68	.6	.....
12	.....	7.0	4.2	122	.6	.....
13	.....	7.0	4.2	122	.6	.....
14	.....	7.0	2.8	408	.6	.....
15	.....	7.0	2.8	244	.6	.....
16	.....	7.0	2.8	112	0.6	.....
17	.....	7.0	2.8	38	.1	.....
18	.....	10.0	2.8	34	0	.....
19	.....	7.0	2.8	34	0	.....
20	.....	4.2	2.8	38	0	.....
21	.....	4.2	7.0	19.0	0	.....
22	.....	4.2	7.0	16.0	0	.....
23	.....	4.2	7.0	16.0	0	.....
24	25	4.2	7.0	16.0	0	.....
25	19.0	4.2	4.2	10.0	0	.....
26	22.0	4.2	4.2	7.0	0	.....
27	22.0	4.2	4.2	7.0	0	.....
28	25	4.2	4.2	7.0	0	.....
29	28	4.2	4.2	7.0	0	.....
30	31	4.2	4.2	7.0	0	.....
31	.....	4.2	.....	7.0	0	.....

Day.	Mar.	Apr.	May.	June.	July.
1910.					
1	.....	116	10	0	2.8
2	.....	80	7	0	2.8
3	.....	84	7	0	2.8
4	.....	116	7	0	.6
5	.....	240	4.2	0	.6
6	.....	240	4.2	0	.6
7	.....	226	4.2	0	.6
8	.....	205	4.2	.1	.1
9	.....	161	4.2	2.8	.1
10	.....	155	4.2	4.2	.1
11	.....	126	4.2	4.2	.1
12	.....	106	4.2	4.2	0
13	387	84	2.8	4.2	.....
14	396	64	2.8	10	.....
15	405	58	2.8	10	.....
16	425	40	4.2	10	.....
17	435	40	4.2	10	.....
18	445	40	4.2	10	.....
19	445	37	2.8	10	.....
20	371	34	2.8	10	.....
21	292	34	2.8	10	.....
22	292	31	.6	10	.....
23	371	28	.6	10	.....
24	610	28	.6	10	.....
25	435	22	.1	10	.....
26	415	16	.1	7	.....
27	531	16	0	4.2	.....
28	520	13	0	4.2	.....
29	498	13	0	2.8	.....
30	396	10	0	2.8	.....
31	292	.....	0	.....	.....

Daily discharge, in second-feet, of Porcupine Creek at Nashua, Mont., 1909–1917—Continued.

Day.	Mar.	Apr.	May.	June.	Sept.	Oct.	Day.	Mar.	Apr.	May.	June.	Sept.	Oct.
1911.							1911.						
1	.....	1.0	4.0	7.8	0	18	16	.....	25	2.0	0.5	142	28
2	.....	1.0	4.0	6.5	0	18	17	.....	22	2.0	.5	101	24
3	.....	1.0	3.0	9.0	0	24	18	.....	19	2.0	.5	68	24
4	.....	.5	3.0	7.8	0	347	19	8.5	16	1.0	.2	52	21
5	.....	.5	3.0	6.5	0	265	20	8.5	12	1.0	.2	45	18
6	.....	1.0	3.0	4.0	183	187	21	6.0	12	1.0	.0	38	18
7	.....	1.0	2.0	4.0	347	117	22	6.0	15	1.0	.0	31	18
8	.....	1.0	2.0	3.0	347	72	23	6.0	12	1.0	.0	31	18
9	.....	.5	2.0	2.0	224	64	24	4.0	7.8	2.0	.0	31	18
10	.....	.5	2.0	1.5	167	56	25	4.0	6.5	2.0	.0	28	18
11	.....	83	1.5	1.0	101	45	26	1.0	6.5	3.0	.0	24	18
12	.....	43	1.5	1.0	68	38	27	4.0	5.2	4.0	.0	21	15
13	.....	74	1.5	.8	52	34	28	8.5	4.0	15	.0	18	15
14	.....	39	1.5	.8	265	31	29	6.0	4.0	12	.0	18	15
15	.....	28	1.0	.8	265	31	30	4.0	3.0	12	.0	18	15
							31	2.0	.....	12	.....	.....	15

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1912.								
1	125	40	145	1.7	2.7	32	6.0	12
2	175	36	125	6.0	1.7	24	6.0	12
3	413	32	100	2.7	1.7	24	6.0	15
4	665	32	96	9.0	2.7	28	9.0	12
5	700	48	92	15	1.7	32	6.0	12
6	659	383	64	18	1.7	48	9.0	15
7	672	245	56	12	1.7	52	12	12
8	686	170	52	12	1.0	48	9.0	12
9	714	195	40	6.0	1.0	48	9.0	15
10	686	108	32	6.0	1.0	44	18	12
11	700	76	24	4.0	1.7	40	15	12
12	693	60	21	6.0	1.0	24	15	.....
13	665	52	18	4.0	1.0	.3	9.0	.....
14	425	44	12	4.0	1.7	1.0	12	.....
15	269	36	15	6.0	1.0	.3	6.0	.....
16	257	32	48	4.0	1.7	15	6.0	.....
17	215	28	40	2.7	2.7	15	9.0	.....
18	165	24	36	4.0	1.7	6.0	6.0	.....
19	155	21	12	4.0	605	2.7	6.0	.....
20	145	21	6	4.0	749	4.0	9.0	.....
21	120	18	2.7	2.7	617	12	6.0	.....
22	104	4.0	4.0	4.0	443	12	6.0	.....
23	92	200	15	2.7	257	6.0	6.0	.....
24	80	130	12	2.7	130	9.0	9.0	.....
25	68	92	12	2.7	92	6.0	6.0	.....
26	60	60	4.0	1.7	48	6.0	6.0	.....
27	56	52	2.7	1.7	48	9.0	12	.....
28	56	700	2.7	2.7	52	6.0	12	.....
29	48	693	1.0	1.7	76	6.0	12	.....
30	44	659	1.0	1.7	48	9.0	15	.....
31	.....	455	.....	1.7	44	.....	12	.....

Daily discharge, in second-feet, of Porcupine Creek at Nashua, Mont., 1909–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1913.									
1	.....	611	14	12	2.5	.....	.....	.....	.....
2	.....	371	14	12	2.5	.....	.....	.....	.....
3	.....	395	14	9.0	1.8	.....	.....	.....	.....
4	.....	275	10	9.0	1.8	.....	.....	.....	.....
5	.....	92	10	7.5	1.8	.....	.....	.....	.....
6	.....	80	10	7.5	1.3	.....	.....	.....	.....
7	.....	68	7.5	6.3	1.3	.....	.....	.....	.....
8	.....	64	7.5	6.3	1.3	.....	.....	.....	.....
9	.....	48	7.5	5.1	1.3	.....	.....	.....	.....
10	.....	42	7.5	4.2	1.3	.....	.....	.....	.....
11	.....	38	7.5	4.2	.8	.....	.....	.....	.....
12	.....	34	12	3.2	.8	.....	.....	.....	.....
13	.....	31	10	3.2	.8	.....	.....	.....	.....
14	.....	31	14	3.2	.8	.....	.....	.....	.....
15	.....	28	19	3.2	.8	.....	.....	.....	.....
16	.....	24	22	3.2	.8	.....	.....	.....	.....
17	.....	20	26	3.2	.8	.....	.....	.....	.....
18	.....	20	28	3.2	.5	.....	.....	.....	.....
19	.....	20	31	2.5	.5	.....	.....	.....	.....
20	.....	20	40	3.2	.5	.....	.....	.....	.....
21	.....	17	38	3.2	.5	.....	.....	.....	.....
22	.....	17	34	4.2	.5	.....	.....	.....	.....
23	.....	17	31	3.2	.5	.....	.....	.....	.....
24	.....	14	28	3.2	.5	.....	.....	.....	.....
25	.....	14	26	2.5	.5	.....	.....	.....	.....
26	.....	14	22	2.5	.5	.....	.....	.....	.....
27	.....	14	20	2.5	.5	.....	.....	.....	.....
28	.....	14	24	2.5	.5	.....	.....	.....	.....
29	.....	14	19	2.5	.5	.....	.....	.....	.....
30	180	14	19	2.5	.5	.....	.....	.....	.....
31	641	.....	17	.....	.1	.....	.....	.....	.....
1914.									
1	.....	192	1.8	1.3	57	0.8	27	3.2	1.3
2	.....	300	4.2	.8	55	5.1	23	1.9	1.3
3	.....	409	3.2	.5	41	10	14	1.8	1.3
4	.....	429	3.2	.5	39	5.1	12	1.8	1.3
5	.....	268	2.5	.8	39	1.8	6.2	1.7	1.3
6	.....	214	3.2	.8	35	.8	4.2	4.2	1.3
7	.....	142	2.5	.8	13	.8	3.2	1.5	1.3
8	.....	106	3.2	.8	10	.5	3.2	.6	1.3
9	.....	81	3.2	.8	8.6	.5	2.5	.6	1.3
10	.....	62	2.5	.8	5.1	.5	2.5	2.5	1.3
11	.....	57	3.2	.5	86	.5	1.8	1.2	1.9
12	.....	48	3.2	.5	76	.5	1.8	1.2	1.9
13	.....	31	4.2	.5	8.6	.5	1.8	1.1	1.9
14	.....	25	3.2	116	8.6	.5	1.3	2.3	1.9
15	31	19	1.8	220	5.1	.5	1.3	3.4	1.3
16	101	18	1.8	142	4.2	.5	1.3	3.4	1.3
17	101	16	1.3	81	6.2	.5	.8	3.3	1.3
18	96	14	1.8	57	6.2	.5	.5	1.4	1.3
19	48	12	1.8	35	5.1	.5	.5	.9	1.3
20	35	10	1.3	31	4.2	.5	.5	.8	1.3
21	35	10	1.3	31	2.5	.8	.5	.8	1.3
22	35	10	.8	19	1.8	.8	.8	.7	.....
23	35	10	.8	19	.8	.8	.8	4.1	.....
24	35	10	.8	18	.8	13	1.3	4.7	.....
25	33	7.3	.8	16	.5	39	1.3	4.0	.....
26	33	6.2	.8	12	.5	220	1.3	.9	.....
27	33	5.1	.8	23	.8	159	1.3	1.3	.....
28	33	5.1	.8	101	.8	101	1.3	2.5	.....
29	35	4.2	1.3	445	.5	71	1.3	1.9	.....
30	37	3.2	1.3	154	.5	35	1.3	1.3	.....
31	91	.....	1.3	.....	.8	31	.....	1.3	.....

Daily discharge, in second-feet, of Porcupine Creek at Nashua, Mont., 1909–1917—Contd.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1915.										
1	.....	.....	7.2	95	3.8	9.3	2.5	0.5	0.5	1.3
2	.....	.....	7.2	205	3.8	5.3	1.3	.5	.5	1.3
3	.....	.....	7.2	336	3.8	5.3	1.3	.5	.5	1.3
4	.....	.....	5.3	185	3.8	5.3	.5	.5	.5	1.3
5	.....	.....	5.3	215	3.8	5.3	.5	.1	.5	1.3
6	.....	.....	3.8	150	3.8	5.3	.5	.1	.5	1.3
7	.....	.....	3.8	100	3.8	5.3	1.3	.1	.5	1.3
8	.....	.....	3.8	80	2.5	5.3	.5	.1	.5	1.3
9	.....	.....	3.8	64	2.5	5.3	1.3	.1	1.3	1.3
10	.....	71	3.8	52	2.5	5.3	1.3	.1	.5	.....
11	.....	64	3.8	40	2.5	2.5	1.3	.1	.5	.....
12	.....	64	2.5	46	2.5	.5	1.3	.1	1.3	.....
13	.....	40	2.5	40	1.3	.5	1.3	.1	1.3	.....
14	.....	35	155	30	1.3	.5	1.3	.5	1.3	.....
15	.....	30	120	20	1.3	.1	3.8	.5	1.3	.....
16	.....	35	70	20	2.5	.1	3.8	.5	1.3	.....
17	.....	35	15.5	15.5	3.8	.1	2.5	.5	1.3	.....
18	.....	24	11.8	11.8	20	.1	2.5	.5	1.3	.....
19	.....	15.5	9.3	11.8	226	13.6	1.3	.5	1.3	.....
20	.....	15.5	7.2	11.8	85	145	.5	.5	1.3	.....
21	.....	11.8	7.2	9.3	20	145	.5	.5	1.3	.....
22	.....	11.8	7.2	7.2	20	58	.5	.5	1.3	.....
23	.....	9.3	7.2	7.2	24	35	.1	.5	1.3	.....
24	.....	9.3	7.2	5.3	24	24	.1	.5	1.3	.....
25	.....	9.3	7.2	5.3	20	20	.1	.5	1.3	.....
26	.....	7.2	175	5.3	20	11.8	.1	.5	1.3	.....
27	.....	7.2	336	5.3	24	9.3	.1	.5	1.3	.....
28	.....	7.2	165	5.3	24	9.3	.1	.5	1.3	.....
29	.....	7.2	110	5.3	16	5.3	.1	.5	1.3	.....
30	.....	7.2	105	5.3	9.3	3.8	.5	.5	1.3	.....
31	.....	.....	100	.....	9.3	3.8	.....	.5	.....	.....
1916.										
1	.....	1,000	42	52	835	88	.2	1.6	5.5	.....
2	.....	1,040	33	42	488	21	.2	1.6	5.5	.....
3	.....	1,030	33	42	386	17	.2	1.6	5.5	.....
4	.....	1,040	33	42	214	14	.2	1.6	5.5	.....
5	.....	1,020	29	33	88	11	.2	2.7	5.5	.....
6	.....	989	29	33	88	7.9	.2	3.9	5.5	.....
7	.....	905	29	33	52	5.5	.2	3.9	3.9	.....
8	.....	775	29	33	52	2.7	.2	3.9	5.5	.....
9	.....	815	25	25	52	2.7	.2	3.9	3.9	.....
10	.....	925	25	25	42	2.7	.6	3.9	3.9	.....
11	.....	1,150	21	25	42	2.7	2.7	3.9	3.9	.....
12	.....	1,070	17	25	33	2.7	2.7	3.9	3.9	.....
13	.....	1,020	17	25	25	2.7	2.7	3.9	3.9	.....
14	.....	956	17	25	17	1.6	1.6	3.9	3.9	.....
15	.....	895	17	21	11	.6	1.6	3.9	3.9	.....
16	.....	700	17	21	5.5	.6	1.6	3.9	3.9	.....
17	.....	612	17	17	5.5	.2	1.6	3.9	3.9	.....
18	.....	540	14	17	646	.2	1.6	5.5	3.9	.....
19	.....	470	14	11	165	.....	1.6	5.5	.....	.....
20	.....	402	14	11	165	.2	1.6	5.5	.....	.....
21	11	306	33	11	102	.2	.6	5.5	.....	.....
22	214	242	95	17	21	.2	1.6	5.5	.....	.....
23	214	158	70	144	21	.2	1.6	5.5	.....	.....
24	186	102	58	158	21	.2	1.6	5.5	.....	.....
25	52	76	42	88	11	.2	1.6	5.5	.....	.....
26	186	52	137	42	5.5	.2	1.6	5.5	.....	.....
27	258	52	102	37	11	.6	1.6	5.5	.....	.....
28	540	52	95	52	7.9	.6	1.6	5.5	.....	.....
29	603	52	88	709	7.9	.6	1.6	5.5	.....	.....
30	567	42	76	1,000	290	.2	1.6	5.5	.....	.....
31	628	.....	52	.....	137	.2	.....	5.5	.....	.....

Daily discharge, in second-feet, of Porcupine Creek at Nashua, Mont., 1909–1917—Contd.

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1917.					1917.				
1	33	82	7.9	.....	16	709	13.7	3.3	.....
2	42	72	9.9	.....	17	434	13.7	3.3	.....
3	42	67	7.6	.....	18	250	13.7	3.3	.....
4	42	62	7.2	.....	19	194	13.7	3.3	.....
5	102	57	6.8	.....	20	281	13.7	3.3	.....
6	458	52	6.4	0.2	21	345	10.8	3.3	.....
7	353	47	6.0	.2	22	254	10.8	3.3	.....
8	800	37	5.6	.....	23	297	7.9	3.3	.....
9	989	33	5.2	.2	24	416	7.9	3.3	.....
10	1,060	33	6.2	.2	25	385	7.9	2.2	.....
11	935	33	6.4	.2	26	269	7.9	1.3	.....
12	962	33	6.4	.....	27	173	7.9	.6	.....
13	956	33	4.7	.....	28	126	5.5	.2	.....
14	855	29	4.7	.....	29	102	5.5	.2	.....
15	905	21	3.3	.....	30	92	5.5	.....	.....
					31	.....	5.5	.....	.....

NOTE.—1908: Station was established July 11, but there was practically no flow that year after July 12, except a little July 16.

1910: Water was standing in pools July 12–28, and the stream was dry July 29. There was little or no flow the rest of the year.

1911: Stream dry June 21 to Sept. 5.

1912: Water over the gage Apr. 3 and over the banks Apr. 4–14. The daily discharge Apr. 3–14 derived from gage heights estimated from flood marks and notes furnished by the observer.

1913: Discharge for August, practically zero.

1914: Nov. 22–30., discharge estimated 1.3 second-feet.

1917: Water standing in pools after June 29, except July 6–7 and 9–10, when about 0.2 second-foot was flowing.

Monthly discharge of Porcupine Creek at Nashua, Mont., 1909–1917.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1909.				
April 24–30	31	19.0	25	342
May	25	4.2	8.2	507
June	7.0	4.2	4.2	253
July	408	2.8	56	3,440
August	7.0	0	1.8	110
The period	.....	.....	.....	4,652
1910.				
March 13–31	610	292	419	15,800
April	240	10	82.1	4,890
May	10	0	31.0	1,910
June	10	0	5.36	319
July	2.8	0	.36	22
The period	.....	.....	.....	22,900
1911.				
March 19–31	8.5	1.0	5.3	137
April	83	.5	14.8	881
May	15	1.0	3.48	214
June	9.0	.0	1.95	116
July	.0	.0	.00	0
August	.0	.0	.00	0
September	347	.0	89.5	5,330
October	347	15	53.1	3,260
The period	.....	.....	.....	9,938

Monthly discharge of Porcupine Creek at Nashua, Mont., 1909–1917—Continued.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1912.				
April	714	44	330	19,600
May	700	4.0	153	9,410
June	145	1.0	36.4	2,170
July	18	1.7	5.07	312
August	749	1.0	104	6,400
September	52	.3	19.0	1,130
October	18	6.0	9.19	565
November 1–11	15	12	12.8	279
The period				39,900
1913.				
March 30–31	641	180	410	1,630
April	611	14	82.0	4,880
May	40	7.5	19.0	1,170
June	12	2.5	4.67	278
July	2.5	.1	.94	58
The period				8,020
1914.				
March 15–31	101	31	49.8	1,680
April	429	3.2	84.1	5,000
May	4.2	.8	2.06	127
June	445	.5	51.0	3,030
July	86	.5	16.9	1,040
August	220	.5	22.7	1,400
September	27	.5	4.02	239
October	4.7	.6	2.01	124
November	1.9		1.38	82
The period				12,700
1915.				
April 10–30	71	7.2	24.6	1,020
May	336	2.5	47.6	2,930
June	336	5.3	59.7	3,550
July	226	1.3	19.1	1,170
August	145	.1	17.6	1,080
September	3.8	.1	1.09	65
October	.5	.1	.38	23
November	1.3	.5	1.03	61
December 1–9	1.3	1.3	1.3	23
The period				9,920
1916.				
March 21–31	628	11	314	6,850
April	1,150	42	616	36,700
May	137	14	42.6	2,620
June	1,000	11	93.9	5,590
July	835	5.5	131	8,060
August	88	.0	6.05	372
September	2.7	.2	1.22	73
October	5.5	1.6	4.29	264
November 1–18	5.5	3.9	4.52	161
The period				60,700
1917.				
April	1,060	33	429	25,500
May	82	5.5	27.2	1,670
June	9.9	.0	4.28	255
July	.2	.0		
The period				27,400

NOTE.—1908: Practically no flow after station was established July 11.
1910: Little or no flow after July.
1917: After June 29, water standing in pools except for July 6–7, 9–10, when approximately 0.2 second-foot was flowing.

Mean monthly discharge, in second-feet, of Porcupine Creek at Nashua, Mont., 1909–1917.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total in acre-feet.
1909	.....	[a] 25	8.2	4.2	56	1.8	.....	.....	.....	.....	.....
1910	[b] 419	82.1	31.0	5.36	.36	0	0	0	.....	.....	22,900
1911	[c] 5.3	14.8	3.48	1.95	0	0	89.5	53.1	.....	.....	9,940
1912	.....	330	153	36.4	5.07	104	19.0	9.19	[d] 12.8	.....	39,900
1913	[e] 410	82.0	19.0	4.67	.94	0	0	0	.....	.....	8,020
1914	[f] 49.8	84.1	2.06	51.0	16.9	22.7	4.02	2.01	1.38	.....	12,700
1915	.....	[g] 24.6	47.6	59.7	19.1	17.6	1.09	.38	1.03	[h] 1.3	9,920
1916	[j] 314	616	42.6	93.9	131	6.05	1.22	4.29	[k] 4.52	.....	60,700
1917	.....	429	27.2	4.28	0	0	0	0	.....	.....	27,400
Average	.....	208	37.1	29.1	25.5	16.9	14.4	8.62	.....	.....	23,900
Median	.....	83.1	27.2	5.36	5.07	1.8	1.16	1.20	.....	.....	17,800
Maximum	.....	616	153	93.9	131	104	89.5	53.1	.....	.....	60,700
Minimum	.....	14.8	2.06	1.95	0	0	0	0	.....	.....	8,020

[a] Apr. 24–30.
[b] Mar. 13–31.
[c] Mar. 19–31.
[d] Nov. 1–11.
[e] Mar. 30–31.
[f] Mar. 15–31.
[g] Apr. 10–30.
[h] Dec. 1–9.
[j] Mar. 21–31.
[k] Nov. 1–18.

NOTE.—Means for periods less than a full month but exceeding 15 days were considered means for the month in finding average and median flow. The median flow given was obtained by arranging the monthly means in their order of magnitude and taking the middle mean, or, if their number was even, the average of the two middle means. By using daily discharge a somewhat lower median discharge would be obtained.

STATIONS ON CANALS.

FORT BELKNAP CANAL NEAR CHINOOK, MONT.

LOCATION.—In SE. ¼ sec. 20, T. 33 N., R. 18 E., at the highway bridge half a mile below head gates of canal on Milk River, 8 miles west of Chinook, in Blaine County.

RECORDS AVAILABLE.—June 21, 1903, to December 31, 1917.

GAGES.—Vertical staff on downstream side of first bent of piles from left bank. From 1903 to 1910 gage located at highway bridge one-fourth mile below. Both gage and bridge washed out by high water of June, 1908, and new gage installed June 27, 1908, at different datum within a few feet of old site. Datum raised 0.62 foot May 3, 1917.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading below gage.

CHANNEL AND CONTROL.—A check weir half a mile below the gage causes backwater at gage. Aquatic plants that grow in canal reduce velocity considerably in last part of irrigation season.

EXTREMES OF DISCHARGE.—Maximum discharge recorded 237 second-feet on May 31, 1906.

REGULATION.—Flow controlled by head gates.

ACCURACY.—Stage-discharge relation not permanent. Numerous discharge measurements and records of changes in check weir necessary to define changes in rating. Records fair.

Discharge measurements of Fort Belknap canal near Chinook, Mont., 1903–1917.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
1903.			
June 28	A. E. Place	3.28	87.0
July 25	E. W. Myers	3.25	76.0
Aug. 21	A. E. Place	.75	.8
1904.			
May 9	A. E. Place	2.34	85
19	L. R. Stockman	2.93	75
June 30	Robert Follansbee	3.00	90
Aug. 9	W. B. Freeman	.81	2.5
1905.			
Apr. 10	L. R. Stockman	2.83	51
22	do	2.92	64
May 19	H. M. Morse	2.70	46
June 16	Stockman and Prall	2.60	28
July 1	H. M. Morse	3.18	68
12	C. T. Prall	2.57	22
20	W. B. Freeman	1.50	5
28	H. M. Morse	3.62	130
29	do	2.35	55
Aug. 3	C. T. Prall	2.68	63
3	do	3.00	68
8	W. B. Freeman	3.16	59
15	H. M. Morse	2.62	15
23	C. T. Prall	.65	1
1906.			
Apr. 5	W. B. Freeman	3.68	134
11	do	3.46	107
18	Babb and Morse	3.25	105
18	Babb and Freeman	3.25	106
22	Freeman and Morse	2.23	26.6
24	do	2.29	29.0
May 8	W. B. Freeman	.72	.91
22	do	2.93	64.6
July 3	do	1.62	11.0
20	H. M. Morse	2.85	61.6
27	W. S. Hartman	2.45	22.3
Aug. 11	H. M. Morse	1.82	4.84
24	do	2.71	12.2
Sept. 4	W. S. Hartman	1.05	5.46
21	do	2.11	14.7
1907.			
May 14	J. B. Pierson	3.45	108
20	do	2.80	56.0
June 3	do	2.45	40.1
July 5	do	2.89	25.0
17	do	2.88	33.6
29	do	3.11	54.4
Aug. 16	Follansbee and Pierson	3.45	66.9
19	J. B. Pierson	3.39	60.7
26	do	3.00	39.3
Sept. 10	do	3.25	54.3
27	Robert Follansbee	2.10	7.7
1908.			
Apr. 10	Stewart and Huch	2.47	22.4
23	A. F. Huch	3.70	106
May 7	do	3.69	88.3
16	do	3.69	97.7
23	do	3.78	109
June 1	do	3.82	108
Aug. 4	do	2.91	63.4
12	do	2.99	69.1
1909.			
Apr. 20	W. A. Lamb	2.70	67
May 12	do	2.65	64
22	do	2.25	43
June 8	do	2.75	63
30	do	2.25	38
Aug. 2	do	2.25	33
20	do	2.18	29
Sept. 13	do	2.01	17.2
27	do	2.15	24
Nov. 18	do	.....	0
1910.			
Apr. 30	M. E. McChristie	2.56	66
May 5	do	2.62	68
13	do	2.65	69
19	do	2.64	62
May 26	M. E. McChristie	2.75	81
June 7	do	2.70	72
1911.			
Apr. 11	W. A. Lamb	2.14	50
22	J. C. Beebe	2.96	104
May 1	do	3.00	110
8	do	2.86	97
12	do	2.71	94
22	do	2.16	51
27	do	2.11	45
June 12	do	1.74	32
20	do	2.43	69
26	do	2.20	55
29	do	1.56	26
July 8	do	1.87	33
27	do	2.23	48
Aug. 1	do	2.03	44
31	R. Richards	1.66	26
1912.			
May 18	R. R. Randell	.38	.4
June 27	do	1.08	11.1
July 8	do	1.15	12.4
26	do	1.50	13.4
Aug. 27	do	1.75	9.6
1913.			
May 4	J. B. Stewart	1.53	23.6
17	do	1.68	32
June 4	do	2.49	58
17	do	2.65	61
27	do	2.50	47
July 10	do	1.88	25
24	do	2.70	42
Aug. 4	do	2.33	14.4
9	do	2.90	26
1914.			
Apr. 28	B. E. Jones	2.72	75
May 4	do	2.55	70
9	do	3.00	97
16	do	2.72	72
25	do	2.83	68
June 2	do	2.95	63
9	do	2.98	50
9	do	2.98	46
20	do	1.60	5
29	do	2.75	27
July 1	W. Arthurs	2.60	22
8	do	2.40	17.6
11	do	2.50	20
18	do	2.80	27
22	do	2.20	7.3
24	do	1.90	4.3
1915.			
Apr. 24	B. E. Jones	2.48	63
May 1	do	2.73	79
8	do	2.52	64
18	do	2.78	74
31	do	2.57	60
June 12	do	1.26	2.9
July 1	do	1.97	25
7	do	2.22	40
Aug. 3	do	1.58	12.2
10	do	1.60	14.4
1916.			
Apr. 24	A. H. Tuttle	1.82	26.5
May 13	do	2.12	41.5
28	do	2.12	35.9
June 16	do	2.50	40.0
July 19	do	1.65	7.8
Aug. 15	do	1.78	12.6
1917.			
May 3	Anderson-Tuttle	.78	12.4
22	A. H. Tuttle	1.47	25.5
June 2	do	1.87	39.6
16	do	1.92	43.0
23	do	2.14	58.0
Aug. 2	do	1.85	48.8
8	do	1.74	41.4

NOTE.—1904: May 9, head gates opened during measurement; result doubtful.
1905: Aug. 3, stage-discharge relation affected by backwater from check in canal. Aug. 23, discharge estimated.
1912: May 18, discharge estimated.

Daily discharge, in second-feet, of Fort Belknap canal near Chinook, Mont., 1903–1917.

Day.	June.	July.	Day.	June.	July.	Day.	June.	July.
1903.			1903.			1903.		
1	.....	87	11	.....	.....	21	107	.....
2	.....	87	12	.....	.....	22	102	.....
3	.....	92	13	.....	.....	23	97	.....
4	.....	92	14	.....	.....	24	102	.....
5	.....	.....	15	.....	.....	25	102	.....
6	.....	.....	16	.....	.....	26	107	.....
7	.....	.....	17	.....	.....	27	107	.....
8	.....	.....	18	.....	.....	28	87	.....
9	.....	.....	19	.....	.....	29	97	.....
10	.....	.....	20	.....	.....	30	97	.....
						31	.....	.....

Day.	May.	June.	July.	Day.	May.	June.	July.	Day.	May.	June.	July.
1904.				1904.				1904.			
1	.....	115	67	11	60	18	40	21	110	95	31
2	.....	110	70	12	65	21	40	22	115	90	28
3	.....	45	65	13	70	19	40	23	120	90	24
4	.....	45	62	14	65	18	40	24	120	90	.....
5	.....	45	60	15	65	18	40	25	120	85	.....
6	.....	45	57	16	65	18	40	26	125	80	.....
7	.....	40	55	17	70	80	43	27	120	75	.....
8	.....	40	50	18	65	90	43	28	120	72	.....
9	45	40	50	19	75	95	40	29	120	75	.....
10	65	24	45	20	70	92	35	30	120	70	.....
								31	120	.....	.....

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Day.	Mar.	Apr.	May.	June.	July.	Aug.
1905.							1905.						
1	.....	82	73	48	68	64	16	.....	66	54	28	14	9
2	.....	76	73	60	55	64	17	.....	66	48	27	11	5
3	.....	70	66	60	39	65	18	.....	66	48	26	8	3
4	.....	70	66	48	39	64	19	.....	66	48	25	7	2
5	.....	63	60	46	39	63	20	.....	73	48	24	5	2
6	.....	63	60	44	47	62	21	.....	66	36	23	5	2
7	.....	63	66	42	54	61	22	.....	64	48	22	4	1
8	.....	57	60	40	62	59	23	.....	66	66	21	4	1
9	.....	63	60	38	54	54	24	.....	66	73	20	4	1
10	.....	56	60	36	47	46	25	.....	66	79	19	3	1
11	.....	54	60	34	39	38	26	.....	66	73	18	3	1
12	.....	60	60	32	32	30	27	100	66	66	17	3	1
13	.....	60	54	31	24	25	28	94	60	60	16	130	1
14	.....	60	60	30	20	20	29	88	73	60	30	55	1
15	.....	66	54	29	18	15	30	82	79	54	40	70	1
							31	82	.....	54	.....	70	1

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1906.					1906.				
1	149	.....	130	17	16	163	.....	.....	105
2	124	.....	130	17	17	163	.....	.....	105
3	124	.....	130	17	18	90	.....	.....	98
4	102	.....	130	17	19	49	.....	.....	78
5	130	.....	130	17	20	34	.....	.....	60
6	163	.....	130	17	21	32	57	.....	45
7	130	.....	.....	17	22	30	73	.....	39
8	124	.....	.....	26	23	23	43	.....	34
9	118	.....	.....	50	24	21	44	.....	28
10	112	.....	.....	50	25	26	50	.....	17
11	107	.....	.....	60	26	20	130	.....	14
12	118	.....	.....	90	27	15	163	.....	9
13	118	.....	.....	130	28	.....	180	.....	7
14	155	.....	.....	113	29	.....	210	.....	.....
15	149	.....	.....	147	30	.....	210	.....	.....
					31	.....	237	.....	.....

Daily discharge, in second-feet, of Fort Belknap canal near Chinook, Mont., 1903–1917—Continued.

Day.	May.	June.	July.	Aug.	Sept.	Day.	May.	June.	July.	Aug.	Sept.
1907.						1907.					
1	.....	.....	22	71	56	16	62	.....	34	75	16
2	.....	.....	26	65	62	17	62	.....	34	68	16
3	.....	40	26	58	62	18	62	.....	34	68	22
4	.....	.....	26	58	62	19	.....	.....	34	68	22
5	.....	.....	26	58	50	20	.....	.....	30	68	19
6	.....	.....	26	68	50	21	.....	.....	34	68	19
7	.....	.....	26	68	50	22	.....	.....	39	62	.....
8	.....	.....	22	68	50	23	.....	.....	50	62	.....
9	.....	.....	22	68	39	24	.....	.....	50	50	.....
10	.....	.....	22	75	50	25	.....	.....	50	44	.....
11	.....	.....	44	75	39	26	.....	.....	50	44	.....
12	89	.....	44	75	39	27	.....	.....	44	39	.....
13	102	.....	44	75	16	28	.....	.....	44	39	.....
14	95	.....	39	75	16	29	.....	.....	65	39	.....
15	70	.....	39	75	16	30	.....	.....	78	39	.....
						31	.....	.....	78	56	.....

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1908.							1908.						
1	.....	90	110	70	70	49	16	81	100	85	106	65	49
2	.....	81	108	78	63	49	17	120	113	85	106	63	46
3	.....	87	104	74	63	46	18	120	126	85	109	63	43
4	.....	93	100	76	63	46	19	117	117	85	102	59	43
5	.....	97	85	78	63	46	20	115	115	85	102	59	43
6	.....	89	85	81	63	46	21	111	117	85	104	59	43
7	.....	88	85	83	59	46	22	111	112	85	106	56	56
8	.....	83	85	85	59	46	23	110	110	85	106	56	43
9	.....	79	85	87	61	46	24	115	108	85	102	56	.....
10	22	78	85	91	63	43	25	120	106	85	102	56	.....
11	85	76	85	93	63	46	26	115	110	85	89	56	.....
12	106	87	85	95	68	46	27	120	117	85	85	56	.....
13	106	95	85	95	66	46	28	115	121	85	78	52	.....
14	105	98	85	102	68	46	29	108	119	85	74	52	.....
15	85	104	85	102	68	49	30	111	121	85	70	52	.....
							31	.....	121	85	70	52	.....

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1909.								
1	.....	89	50	38	16	30	20	24
2	.....	85	55	40	30	30	20	24
3	.....	74	61	44	30	30	20	24
4	.....	74	67	44	34	30	20	22
5	.....	74	66	46	38	30	20	20
6	.....	81	66	46	38	30	21	18
7	.....	74	66	44	34	30	22	18
8	.....	74	66	44	34	30	22	18
9	.....	70	66	46	34	30	23	18
10	.....	67	66	46	32	17	24	18
11	74	70	63	44	32	17	24	18
12	74	74	60	44	34	17	24	18
13	74	74	60	42	36	17	24	18
14	74	74	60	42	38	16	24	.....
15	78	74	63	42	38	15	24	.....
16	78	81	63	42	36	14	24	.....
17	81	74	66	42	38	13	25	.....
18	81	64	66	42	43	13	26	.....
19	85	52	73	38	32	12	26	.....
20	85	45	80	44	30	12	26	.....
21	85	45	0	49	30	12	25	.....
22	81	43	0	46	30	22	25	.....
23	81	41	0	46	30	22	24	.....
24	85	41	0	44	32	22	24	.....
25	85	50	0	49	30	21	24	.....
26	89	48	0	49	30	21	25	.....
27	89	45	36	54	30	20	25	.....
28	89	45	36	54	30	20	26	.....
29	85	45	38	0	30	20	26	.....
30	89	48	38	0	30	20	26	.....
31	.....	50	.....	0	30	.....	25	.....

Daily discharge, in second-feet, of Fort Belknap canal near Chinook, Mont., 1903–1917—Continued.

Day.	May.	June.	Day.	May.	June.	Day.	May.	June.
1910.			1910.			1910.		
1	67	75	11	67	67	21	62	56
2	67	72	12	67	.....	22	62	59
3	67	72	13	67	.....	23	73	59
4	67	72	14	67	.....	24	73	59
5	67	72	15	67	.....	25	81	59
6	67	72	16	62	.....	26	81	.....
7	70	72	17	62	.....	27	81	.....
8	70	72	18	62	.....	28	81	.....
9	67	67	19	62	.....	29	75	.....
10	67	67	20	62	.....	30	75	.....
						31	67	.....

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1911.							1911.						
1	.....	110	51	28	43	16	16	.....	116	27	61	30	.....
2	.....	110	51	29	50	21	17	.....	116	43	66	21	.....
3	.....	110	51	30	50	17	18	.....	110	43	58	31	.....
4	.....	110	51	31	48	17	19	.....	86	65	59	26	.....
5	.....	110	51	32	44	8	20	.....	86	65	57	27	.....
6	.....	86	43	33	43	5	21	158	94	72	58	27	.....
7	.....	86	43	33	43	2	22	158	51	72	56	30	.....
8	.....	99	43	42	43	0	23	158	76	79	52	33	.....
9	.....	110	43	49	44	.....	24	94	76	80	54	35	.....
10	.....	110	38	56	38	.....	25	86	80	80	54	34	.....
11	.....	116	34	55	43	.....	26	79	80	43	51	34	.....
12	.....	95	30	55	30	.....	27	94	45	48	48	35	.....
13	.....	94	30	52	34	.....	28	86	45	30	47	27	.....
14	.....	94	30	49	34	.....	29	79	45	30	45	16	.....
15	.....	94	27	54	30	.....	30	94	45	27	48	16	.....
							31	.....	51	.....	45	16	.....

Day.	June.	July.	Aug.	Sept.	Oct.	Nov.	Day.	June.	July.	Aug.	Sept.	Oct.	Nov.
1912.							1912.						
1	.....	12	13	9.5	8.5	2.8	16	.....	20	7.8	8.5	2.8	0.8
2	.....	12	13	9.5	6.8	2.8	17	.....	12	8.5	8.5	2.8	.....
3	.....	12	13	9.5	6.8	1.8	18	.....	7.8	7.8	8.5	2.8	.....
4	.....	12	10	9.5	6.0	1.8	19	.....	15	7.8	8.5	2.8	.....
5	.....	14	10	9.5	5.2	1.8	20	.....	14	7.8	7.6	2.8	.....
6	.....	8.6	10	9.5	4.6	1.3	21	.....	15	7.8	7.6	2.8	.....
7	.....	8.6	9.3	9.5	2.8	.8	22	.....	15	6.8	6.0	2.8	.....
8	.....	14	9.3	9.5	2.8	.8	23	.....	15	6.8	6.8	2.8	.....
9	.....	10	9.3	9.5	2.8	.8	24	.....	15	6.8	6.8	2.8	.....
10	.....	10	8.5	9.5	2.8	.8	25	6.0	15	7.0	6.8	2.8	.....
11	.....	10	12	9.5	2.8	.8	26	9.5	13	7.0	6.8	2.8	.....
12	.....	9.5	11	8.5	2.8	.8	27	12	11	9.5	8.5	2.8	.....
13	.....	8.5	12	7.6	2.8	.8	28	21	16	9.5	8.5	2.8	.....
14	.....	10	11	6.8	2.8	.8	29	12	15	8.5	8.5	2.8	.....
15	.....	17	11	10	2.8	.8	30	12	15	8.5	8.5	2.8	.....
							31	.....	15	8.5	.....	2.8	.....

Daily discharge, in second-feet, of Fort Belknap canal near Chinook, Mont., 1903–1917—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1913.							1913.						
1	.....	22	55	30	19	8	16	.....	46	52	31	21	4
2	.....	20	54	27	18	8	17	.....	32	55	45	20	.....
3	.....	20	54	21	17	8	18	.....	28	63	43	20	.....
4	.....	20	58	21	13	8	19	.....	31	70	51	17	.....
5	.....	23	58	10	23	8	20	.....	31	56	49	24	.....
6	.....	25	57	14	27	8	21	.....	26	55	47	11	.....
7	.....	26	54	13	28	10	22	.....	34	55	45	10	.....
8	.....	32	56	15	27	9	23	.....	29	52	44	9	.....
9	.....	41	55	18	27	8	24	.....	31	48	42	8	.....
10	.....	50	75	26	26	8	25	.....	32	48	38	7	.....
11	.....	44	77	25	27	6	26	.....	31	51	36	0	.....
12	.....	45	77	31	26	7	27	42	32	47	33	0	.....
13	.....	51	73	30	26	7	28	42	37	47	31	0	.....
14	.....	40	72	29	26	6	29	42	39	51	27	0	.....
15	.....	25	65	30	24	6	30	23	43	38	25	8	.....
							31	.....	40	.....	22	8	.....

Day.	Apr.	May.	June.	July.	Aug.	Day.	Apr.	May.	June.	July.	Aug.
1914.						1914.					
1	.....	83	62	18	0.5	16	.....	76	6.6	20	0.0
2	.....	80	60	18	.4	17	.....	75	6.2	20	.0
3	.....	80	58	18	.4	18	.....	74	5.8	25	.0
4	.....	70	60	18	.4	19	43	75	5.4	20	.0
5	.....	70	58	18	.4	20	43	77	7.0	14	.0
6	.....	80	55	18	.4	21	50	70	18	6.4	.0
7	.....	80	52	18	.3	22	80	69	18	5.9	.0
8	.....	86	63	18	.3	23	80	68	16	3.3	.0
9	.....	90	47	16	.3	24	76	67	17	2.6	.2
10	.....	90	42	16	.3	25	76	69	18	2.3	.7
11	.....	96	41	18	.2	26	83	65	18	1.5	.5
12	.....	89	41	19	.2	27	76	64	20	1.0	.4
13	.....	80	38	19	.1	28	80	60	25	.8	.4
14	.....	79	7.5	19	.0	29	83	55	22	.7	.0
15	.....	77	7.0	17	.0	30	83	65	22	.6	.2
						31	.....	60	.....	.5	.0

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1915.							1915.						
1	.....	76	61	25	11.0	12.5	16	53	72	4.2	11.0	12.5	12.5
2	.....	80	58	25	12.5	12.5	17	64	72	3.2	11.0	12.5	12.5
3	.....	80	49	25	12.5	12.5	18	62	75	3.2	11.0	12.5	12.5
4	.....	70	27	25	12.5	12.5	19	62	75	3.2	12.5	11.0	11.0
5	.....	62	16.0	27	12.5	12.5	20	67	72	3.2	6.7	11.0	.....
6	.....	64	.5	37	12.5	12.5	21	64	55	3.2	4.2	11.0	.....
7	.....	59	27	37	12.5	12.5	22	62	55	3.2	4.2	11.0	.....
8	.....	64	19.5	2.2	12.5	12.5	23	59	52	3.2	4.2	.0	.....
9	.....	64	8.1	32	12.5	12.5	24	59	68	6.7	4.2	.0	.....
10	10	67	2.2	32	12.5	12.5	25	67	68	19.5	4.2	.0	.....
11	39	68	2.2	19.5	12.5	14.2	26	64	64	19.5	4.2	.0	.....
12	39	74	3.2	19.5	12.5	14.2	27	62	61	19.5	5.4	.0	.....
13	64	79	3.2	16.0	12.5	14.2	28	62	62	23	6.7	.0	.....
14	39	74	3.2	14.2	12.5	14.2	29	62	64	43	11.0	.0	.....
15	53	73	3.2	12.5	12.5	12.5	30	80	61	49	11.0	6.7	.....
							31	.....	61	.....	11.0	11.0	.....

Daily discharge, in second-feet, of Fort Belknap canal near Chinook, Mont., 1903–1917—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1916.							1917.						
1	.....	22	41	21	13	13	1	12.0	40.0	48.0	56.0	30.0	0.4
2	.....	18	47	11	13	13	2	12.0	41.0	48.0	49.0	22.0	.4
3	.....	18	58	11	13	13	3	12.0	34.0	48.0	55.0	22.0	.4
4	.....	26	58	11	13	13	4	13.0	30.0	48.0	45.0	22.0	1.0
5	.....	26	58	6.2	13	13	5	14.0	32.0	48.0	45.0	22.0	1.7
6	.....	28	58	2.8	13	25	6	15.0	30.0	48.0	43.0	22.0	2.3
7	.....	26	64	2.8	13	25	7	24.0	30.0	48.0	43.0	22.0	2.3
8	.....	30	61	2.8	13	25	8	24.0	30.0	62.0	41.0	22.0	2.3
9	.....	30	58	2.8	13	25	9	24.0	36.0	62.0	38.0	15.0	1.9
10	.....	30	64	2.8	13	25	10	24.0	42.0	78.0	33.0	15.0	1.5
11	.....	35	38	2.8	13	21	11	24.0	43.0	78.0	33.0	15.0	1.5
12	.....	40	26	2.8	13	21	12	24.0	42.0	78.0	33.0	14.0	1.5
13	.....	41	33	1.4	6.5	9.5	13	24.0	39.0	78.0	32.0	12.0	1.5
14	.....	52	38	1.4	6.5	9.5	14	25.0	39.0	62.0	33.0	12.0	1.5
15	.....	49	40	1.4	11	9.5	15	21.0	35.0	59.0	37.0	12.0	1.5
16	6.2	49	39	1.4	9.5	9.5	16	21.0	44.0	59.0	38.0	12.0	1.9
17	18	52	38	1.4	13	9.5	17	22.0	39.0	59.0	37.0	12.0	1.9
18	20	63	35	6.2	15	8	18	22.0	42.0	59.0	32.0	11.0	1.5
19	22	67	35	8.0	17	8	19	26.0	42.0	59.0	18.0	11.0	1.5
20	24	65	43	6.5	19	8	20	24.0	48.0	58.0	22.0	9.7	1.5
21	26	70	43	6.5	14	8	21	24.0	58.0	58.0	22.0	8.5	.....
22	26	63	38	9.5	9.5	8	22	26.0	58.0	55.0	23.0	8.5	.....
23	26	49	38	9.5	9.5	8	23	26.0	58.0	53.0	23.0	4.2	.....
24	26	46	38	13	9.5	8	24	26.0	44.0	53.0	26.0	3.5	.....
25	26	46	30	17	11	8	25	31.0	48.0	52.0	23.0	4.2	.....
26	26	46	30	17	11	8	26	31.0	48.0	52.0	25.0	4.2	.....
27	26	46	30	9.5	13	8	27	33.0	55.0	51.0	26.0	4.2	.....
28	26	38	30	9.5	13	8	28	37.0	48.0	51.0	26.0	4.2	.....
29	26	41	22	9.5	13	8	29	43.0	48.0	52.0	26.0	4.2	.....
30	22	41	22	13	13	8	30	46.0	48.0	52.0	27.0	.5	.....
31	.....	47	.....	13	13	.....	31	46.0	.....	52.0	30.0	.....	.....

NOTE.—1904: Canal operated from May 2 to July 23, when it was closed for lack of water.
1906: Apr. 28 to May 20 and June 7–30, canal headgates closed. Practically dry after July 29.
1907: May 19 to June 30 canal in operation but no observer available. Head gates closed Sept. 22.
1908: Gage was washed out by high water June 5 and replaced July 1; mean discharge June 5–30 estimated at 85 second-feet. Head gates closed Sept. 23.
1909: Gates closed for the season Nov. 18.
1910: Mar. 19 to Apr. 30 no gage readings recorded. See table of monthly discharge for estimated mean discharge. Gates closed June 12–20; closed for the season June 26.
1911: Apr. 1–20 total flow estimated at 2,090 acre-feet. July 1–6 discharge estimated. Gates closed for season Sept. 8.
1912: Canal dry previous to June 25.
1913: Head gates opened Apr. 27 and closed Sept. 17.
1914: Work was begun on head gates Apr. 6, but there was not much flow until Apr. 19; mean discharge Apr. 6–18 estimated at 15 second-feet. June 20 head gates raised in afternoon; discharge computed from observer's reading and current-meter measurement. Aug. 17–23 gage not read; probably no discharge.
1915: Aug. 23–29 canal dry.
1916: Head gates opened Apr. 16.
1917: Head gates opened May 6. Check gate below gage placed May 6 and raised May 30; partly removed July 15–16. Discharge estimated May 1–3 and interpolated May 4–5.

Monthly discharge of Fort Belknap canal near Chinook, Mont., 1903–1917.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1903.				
June 21–30	107	87	100	1,983
July 1–4	92	87	90	714
The period	.....	.....	.....	2,697
1904.				
May 9–31	125	45	91	4,151
June	115	18	61	3,630
July 1–23	70	24	46	2,098
The period	.....	.....	.....	9,879

Monthly discharge of Fort Belknap canal near Chinook, Mont., 1903–1917—Continued.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1905.				
March 27–31	100	82	89	883
April	82	54	66	3,927
May	79	36	60	3,689
June	60	16	32	1,904
July	130	3	33	2,029
August	65	1	25	1,537
The period				13,970
1906.				
April 1–27	163	15	95.9	5,140
May 21–31	237	43	127	2,770
June 1–6	130	130	130	1,550
July 1–28	147	7	50.9	2,830
The period				12,300
1907.				
May 12–18	102	62	77.4	1,070
July	78	22	38.8	2,390
August	75	39	62.0	3,810
September 1–21	62	16	36.7	1,530
The period				8,800
1908.				
April 10–30	120	22	105	4,370
May	126	76	102	6,270
June	110	85	87.7	5,220
July	109	70	90.4	5,560
August	70	52	60.4	3,710
September 1–23	56	43	46.2	2,110
The period				27,240
1909.				
April 11–30	89	74	82.1	3,260
May	89	41	62.8	3,860
June	80	0	47.7	2,840
July	54		40.4	2,480
August	43	16	32.5	2,000
September	30	12	21.1	1,260
October	26	20	23.7	1,460
November 1–13	24	18	19.9	513
The period				17,700
1910.				
March 19–31			32.8	845
April			63.0	3,750
May	81	67	68.8	4,240
June, 16 days	75	56	67.0	2,130
The period				11,000
1911.				
March 25–31				450
April				4,250
May	116	45	88.3	5,430
June	80	27	47.3	2,810
July	66	28	48.0	2,950
August	50	16	34.0	2,090
September 1–7	21	0	12.3	171
The period				18,200
1912.				
June 25–30	21	.0	12.1	144
July	20	7.8	12.8	787
August	13	6.8	9.32	573
September	10	6.0	8.46	503
October	8.5	2.8	3.48	214
November 1–16	2.8	.8	1.27	40.3
The period				2,260

Monthly discharge of Fort Belknap canal near Chinook, Mont., 1903–1917—Continued.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1913.				
April 27–30	42	23	37.2	295
May	51	20	33.1	2,040
June	77	38	57.6	3,430
July	51	10	30.6	1,880
August	28	0	16.7	1,030
September 1–17	10	0	7.0	236
The period				8,910
1914.				
April 7–30	83		43.0	2,050
May	96	55	74.8	4,600
June	63	5.4	30.6	1,820
July	25	.5	12.7	781
August	.7	.0	.22	13.5
The period				9,260
1915.				
April 10–30	80	10	56.8	2,370
May	80	52	67.5	4,150
June	61	.5	16.3	970
July	37	2.2	15.2	935
August	12.5	0	9.2	566
September 1–19	14.2	11	12.8	483
The period				9,470
1916.				
April 16–30	26	6.2	23.1	687
May	70	18	41.9	2,580
June	64	22	41.8	2,490
July	21	1.4	7.56	465
August	19	6.5	12.4	762
September	25	8	12.8	762
The period				7,750
1917.				
May	46	12	25	1,540
June	58	30	42.4	2,520
July	78	48	57.0	3,500
August	56	18	33.5	2,060
September	30	.5	12.7	756
October 1–20	23	.4	1.50	59.5
The period				10,400

NOTE.—1903: Record probably does not cover the total water diverted.
1907: May 19 to June 30, no observer available, although the canal was in operation.
1910: Mean discharge, Mar. 19 to Apr. 30, estimated from statements of observer.
1911: Mar. 25 to Apr. 20, discharge estimated.

Total monthly discharge, in acre-feet, of Fort Belknap canal near Chinook, Mont., 1903–1917.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Total.
1903	.....	(a)	(a)	1,980	714	.....	.....	.....	.....	a 2,690
1904	.....	.....	4,150	3,630	2,100	.....	.....	.....	.....	9,880
1905	883	3,930	3,690	1,900	2,030	1,540	.....	.....	.....	14,000
1906	.....	5,140	2,770	1,550	2,830	.....	.....	.....	.....	12,300
1907	.....	(a)	a 1,070	(a)	2,390	3,810	1,530	.....	.....	a 8,800
1908	.....	4,370	6,270	5,220	5,560	3,710	2,110	.....	.....	27,200
1909	.....	3,260	3,860	2,840	2,480	2,000	1,260	1,460	513	17,700
1910	b 845	b 3,750	4,240	2,130	.....	.....	.....	.....	.....	11,000
1911	450	4,250	5,430	2,810	2,950	2,090	171	.....	.....	18,200
1912	.....	.....	.....	144	787	573	503	214	40.3	2,260
1913	.....	295	2,040	3,430	1,880	1,030	236	.....	.....	8,910
1914	.....	2,050	4,600	1,820	781	13.5	.....	.....	.....	9,260
1915	.....	2,370	4,150	970	935	566	483	.....	.....	9,470
1916	.....	687	2,580	2,490	465	762	762	.....	.....	7,750
1917	.....	.....	1,540	2,520	3,500	2,060	756	59.5	.....	10,400
Average	.....	2,320	3,490	2,390	1,960	1,210	521	.....	.....	12,200

a Record does not include total flow. Results not included in the average. b Estimated.

NOTE.—In computing the average flow the canal was assumed dry when no discharge was recorded, except as noted for 1903 and 1907.

WINTER-ANDERSON CANAL NEAR CHINOOK, MONT.

LOCATION.—In the SW. ¼ sec. 4, T. 32 N., R. 20 E., at the highway bridge 2 miles below the head of the canal on Milk River and 5 miles southeast of Chinook in Blaine County.

RECORDS AVAILABLE.—April 22, 1906, to June 20, 1908. Canal not used in 1907.

GAGE.—A vertical staff fastened to a post in the bed of the canal just downstream from a highway bridge crossing the canal.

DISCHARGE MEASUREMENTS.—Made by wading a short distance above the gage.

CHANNEL AND CONTROL.—The canal bed below the gage forms the control. It is composed of mud, and changes in the control are caused by the deposition of silt and the growth of weeds. There are no checks in the canal for several miles below the gage.

REGULATION.—The flow of the canal is regulated by head gates.

ACCURACY.—Stage-discharge relation not permanent. The gage-height record for 1906 and 1908 good up to June 10, 1908. The gage was washed out June 11, 1908, and the dam and head gates so badly damaged that it was impossible for water to enter the canal after June 24, 1908. Records fair.

Discharge measurements of Winter-Anderson canal near Chinook, Mont., 1906 and 1908.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1906.		*Feet.*	*Sec.-ft.*	1908.		*Feet.*	*Sec.-ft.*
Apr. 22	Morse and Freeman	3.20	10.0	May 25	A. F. Huch	3.19	2.1
May 5	W. B. Freeman	2.25	.75	June 2	do	3.5	5.8
23	do	2.45	1.0	12	do	.....	4.2
June 12	do	3.61	22.3	24	do	.....	0
27	W. S. Hartman	2.90	4.51				
July 25	do	.....	0				

NOTE.—1908: Station visited Apr. 7 and 27, May 6 and 15, and no flow was found. The measurement of May 25 was made at a flume 1 mile below gage.

Daily discharge, in second-feet, of Winter-Anderson canal near Chinook, Mont., 1906 and 1908.

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1906.					1906.				
1	.....	2.8	18.4	4.6	16	.....	0.2	5.3	0.7
2	.....	2.8	31.2	3.6	17	.....	.1	4.7	.4
3	.....	.7	27.4	3.6	18	.....	.....	4.7	.4
4	.....	.7	20.0	3.6	19	.....	.....	4.7	.4
5	.....	.7	12.5	3.2	20	.....	.....	4.7	.4
6	.....	.7	12.5	2.8	21	.....	3.6	4.7	.4
7	.....	.7	20.8	2	22	.....	2.4	4.7	.3
8	.....	.7	29.2	1.9	23	3.6	1.3	4.7	.2
9	.....	.7	49	1.4	24	3.2	.7	4.7	.2
10	.....	.7	68	1	25	2.8	1.0	4.7	.2
11	.....	.7	42	1	26	2.8	1.5	4.7	.2
12	.....	.7	18.4	.7	27	2.8	2.0	4.7	.5
13	.....	.7	12.5	.5	28	2.8	2.8	4.7	1
14	.....	.7	6	.2	29	2.8	4.1	6	.2
15	.....	.4	6	.7	30	2.8	12.2	4.7	1
					31	.....	20.2	.....	.2

Daily discharge, in second-feet, of Winter-Anderson canal near Chinook, Mont., 1906 and 1908—Continued.

Day.	Apr.	May.	June.	Day.	Apr.	May.	June.	Day.	Apr.	May.	June.
1908.				1908.				1908.			
1	.....	.....	3	11	.....	.....	4	21	.....	7	.....
2	.....	.....	8	12	.....	.....	4	22	.....	6	.....
3	.....	1	6	13	.....	.....	4	23	.....	4	.....
4	.....	2	6	14	.....	.....	3	24	.....	3	.....
5	.....	1	6	15	.....	.....	3	25	1	3	.....
6	.....	1	8	16	.....	.....	2	26	2	3	.....
7	.....	.....	9	17	.....	.....	2	27	2	4	.....
8	.....	.....	22	18	.....	.....	2	28	1	3	.....
9	.....	.....	24	19	.....	.....	1	29	.....	1	.....
10	.....	.....	19	20	.....	6	1	30	.....	2	.....
								31	.....	3	.....

NOTE.—1906: May 3–20, head gates closed, but some water leaking into canal. June 9–11, determination of discharge likely to be in error because of lack of measurements at high water. The high discharge was due to flood stages in Milk River and the water probably was not used. Canal practically dry after July 31, 1906.

1908: Little flow before May 20. Gage was washed out June 11, and the dam and head gates so badly damaged that it was impossible to divert water after June 20. The discharge June 11–20 estimated.

Monthly discharge of Winter-Anderson canal near Chinook, Mont., 1906 and 1908.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1906.				
April 23–30	3.6	2.8	3.0	48
May	20.2	.0	2.1	129
June	68	4.7	14.9	887
July	4.6	.2	1.2	74
The period	.....	.....	.....	1,140
1908.				
April 25–28	.....	.....	1.50	12
May, 16 days	7	1	3.12	99
June, 20 days	24	1	6.85	272
The period	.....	.....	.....	383

NOTE.—Canal not used in 1907.

PARADISE VALLEY CANAL NEAR CHINOOK, MONT.

LOCATION.—In SW. ¼ sec. 35, T. 33 N., R. 20 E., about 300 feet below head gates on Milk River, 30 feet below flume of Cook canal, on the ranch of Rudolph Friede, 6 miles southeast of Chinook, in Blaine County.

RECORDS AVAILABLE.—June, 1903, to December 31, 1917.

GAGE.—Vertical staff on left bank, 300 feet below head gates, and 30 feet below flume carrying Cook canal over Paradise Valley canal.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed of canal is earth; silt is deposited during the irrigation season. Weeds grow in the bottom of the canal during the summer months. A large slough into which the canal flows a few hundred feet below the gage may affect results, the height of the water in slough possibly affecting the slope of the water surface at the gage.

EXTREMES OF DISCHARGE.—Maximum discharge recorded, 32 second-feet June 27, 1911.

ACCURACY.—Control affected by deposition of silt and growth of vegetal matter in the canal. Frequent discharge measurements are necessary to determine the extent of these changes. Records fair.

Discharge measurements of Paradise Valley canal near Chinook, Mont., 1903–1917.

Date.	Made by—	Gage height.	Discharge.
1903.		*Feet.*	*Sec.-ft.*
June 26	A. E. Place	1.58	16.8
Aug. 20	do	.75	.5
1904.			
May 18	L. R. Stockman	.82	7.2
June 30	Robert Follansbee	1.20	5.3
Aug. 9	W. B. Freeman	1.01	5.3
1905.			
Apr. 8	L. R. Stockman	.45	3.5
24	Stockman and Morse	.76	10.1
May 17	H. M. Morse	.81	6.6
June 3	do	1.08	7.8
17	Stockman and Prall	.98	4.8
24	C. T. Prall	1.01	5.4
24	do	1.02	5.0
July 8	Freeman and Morse	1.09	4.8
15	C. T. Prall	.98	3.4
21	W. B. Freeman	1.01	5.1
27	H. M. Morse	1.37	10.0
Aug. 5	W. B. Freeman	.50	7
1906.			
Apr. 13	W. B. Freeman	.94	3.05
May 5	do	.67	1.30
23	do	1.19	5.4
June 27	Freeman and Hartman	1.60	9.78
July 19	Hartman and Morse	1.79	14.3
25	W. S. Hartman	1.45	7.48
Aug. 25	do	.....	.0
Sept. 5	do	.....	.0
1907.			
May 4	J. B. Pierson	1.55	7.7
June 3	do	.68	.0
19	do	1.16	.0
July 8	do	1.49	2.6
17	do	1.26	1.3
30	do	1.09	1.4
Aug. 17	do	1.60	7.0
24	do	1.58	6.1
Sept. 10	do	1.04	1.0
27	Robert Follansbee	1.31	2.1
1908.			
Apr. 7	Stewart and Huch	1.41	5.3
27	A. F. Huch	1.89	22.6
May 6	do	1.50	10.8
15	Stewart and Huch	1.28	6.2
25	A. F. Huch	1.51	7.0
June 2	do	1.41	4.2
12	do	1.00	1.0
24	do	1.20	1.7
July 6	do	1.60	5.3
17	do	1.80	7.1
Aug. 6	do	1.90	6.7
1909.			
May 3	W. A. Lamb	1.71	10.2
18	do	1.85	14.2
June 9	do	1.10	.0
26	do	1.30	.4
July 14	do	1.45	1.1
Aug. 1	do	2.30	13.8
20	.....	.....	.0
1911.		*Feet.*	*Sec.-ft.*
Apr. 24	J. C. Beebe	1.41	11.2
May 2	do	1.38	12
9	do	1.51	15.7
13	do	1.77	21
20	do	1.42	8.6
26	do	1.25	5.3
June 11	do	1.25	15.9
22	do	.91	.5
29	do	1.32	5.0
July 5	do	1.30	3.0
28	do	1.32	1.8
Aug. 1	do	1.71	7.1
1912.			
July 25	R. R. Randell	1.85	3.8
1913.			
June 16	J. B. Stewart	2.10	11.2
28	do	2.10	9.7
July 11	do	1.90	6.1
25	do	1.77	4.8
Aug. 4	do	1.95	5.8
11	do	1.90	7.8
1914.			
Apr. 29	B. E. Jones	1.51	11.6
May 4	do	1.70	15.6
9	do	1.62	13.7
16	do	1.28	6.0
25	do	1.67	9.4
27	do	1.74	10.8
June 2	do	1.38	5.6
8	do	1.43	5.3
8	do	1.83	11.3
9	do	1.62	7.6
22	do	1.31	2.5
30	do	1.07	1.5
1915.			
Apr. 26	B. E. Jones	.84	2.2
May 3	do	1.30	6.0
10	do	1.93	17.9
18	do	1.76	9 8
June 2	do	1.58	6.2
12	do	1.60	6.2
19	do	1.82	9.7
29	do	1.52	5.0
July 6	do	1.57	5.1
22	do	1.20	1.2
Aug. 2	do	1.37	1.8
9	do	.97	.2
1916.			
Apr. 14	A. H. Tuttle	(a)	.....
May 3	do	1.58	5.3
14	do	1.78	7.3
28	do	2.17	9.7
June 16	do	1.84	4.8
July 19	do	2.00	3.3
Aug. 15	do	(a)	.....
1917.			
June 23	A. H. Tuttle	1.63	4.1
July 14	do	1.96	11.5
Aug. 1	do	2.16	10.9
9	do	2.08	9.8

[a] Canal dry.

NOTE.—1911: June 11, stage-discharge relation affected by changing stage, water having just been turned into canal.

1914: June 2, discharge is mean of two measurements at different sections. June 22, probably backwater at gage. July 7, W. Arthurs, ditchrider, estimated that zero flow would occur at about gage height 0.58 foot.

Mean daily gage height, in feet, of Paradise Valley canal near Chinook, Mont., 1903.

Day.	July.	Aug.	Sept.	Oct.	Day.	July.	Aug.	Sept.	Oct.
1	.....	1.01	0.89	0.90	16	.....	0.75	.....	1.06
2	.....	1.08	.84	.90	17	.....	.75	.....	1.00
3	.....	1.18	.81	.98	18	.....	.74	.....	1.15
4	.....	1.27	.78	1.10	19	.....	.70	.....	1.05
5	.....	1.30	.75	1.05	20	.....	.70	.....	1.00
6	.....	1.20	.....	.85	21	.....	.65	.....	1.00
7	.....	1.18	.....	.90	22	.....	.....	.....	1.00
8	.....	1.12	.....	.82	23	.....	.....	.....	1.00
9	.....	1.03	.....	.95	24	.....	.....	.....	.97
10	.....	.97	.....	1.02	25	.....	.....	.....	1.07
11	.....	.92	.....	1.12	26	0.85	.....	.....	1.05
12	.....	.91	.....	1.12	27	2.23	.90	.....	1.00
13	.....	.89	.....	1.10	28	1.50	.93	.....	1.00
14	.....	.83	.....	.97	29	1.33	.91	.....	1.00
15	.....	.80	.....	1.05	30	1.28	.90	.....	.95
					31	1.05	.89	.....	1.05

NOTE.—Canal dry Aug. 22–26 and Sept. 6–30.

Mean daily discharge, in second-feet, of Paradise Valley canal near Chinook, Mont., 1904–1917.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1904.							1904.						
1	.....	5.0	6.5	5.0	.....	.....	16	8.0	.....	7.5	3.0	.....	.....
2	.....	15.0	7.5	5.0	.....	.....	17	8.0	3.5	3.5	2.5	.....	0.5
3	.....	8.0	7.5	6.0	.....	.....	18	2.5	1.0	4.5	2.5	.....	1.0
4	.....	5.0	8.0	6.0	.....	.....	19	14.5	1.0	6.5	2.0	.....	2.0
5	.....	5.0	9.0	6.0	.....	.....	20	16.0	.....	7.5	2.5	.....	2.0
6	.....	7.0	9.0	6.0	.....	.....	21	11.5	3.5	8.5	1.0	.....	.....
7	.....	6.0	9.0	6.0	.....	.....	22	6.5	2.5	7.5	1.0	.....	.....
8	.....	5.0	9.0	5.0	.....	.....	23	5.0	.....	9.5	1.0	.....	.....
9	.....	2.5	8.0	5.0	.....	.....	24	8.0	5.5	10.0	.5	.....	.....
10	.....	2.5	8.0	5.0	.....	.....	25	10.5	10.0	10.0	.....	.....	.....
11	5.5	.5	10.0	5.0	.....	0.5	26	13.5	10.0	8.5	.....	.....	.....
12	3.0	1.0	10.0	4.0	.....	1.0	27	10.5	10.0	6.5	.....	.....	.....
13	1.0	1.0	10.0	3.5	.....	.5	28	10.0	9.0	6.5	.....	.....	.....
14	.0	.0	9.5	3.5	.....	.5	29	8.0	7.5	6.5	.....	.....	.....
15	8.0	.....	9.5	3.0	.....	.....	30	7.5	7.5	2.5	.....	.....	.....
							31	8.0	.....	4.0	.....	.....	.....

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Day.	Mar.	Apr.	May.	June.	July.	Aug.
1905.							1905.						
1	.....	1	4	8	8	1.0	16	.....	13	6.5	6	6	0.1
2	.....	.5	6	8	9	.5	17	.....	12	6.5	5	6	.....
3	.....	.5	8	8	7	.5	18	.....	17	6.5	5	6	.....
4	.....	3	10	7	7	.5	19	.....	17	6.5	4	5	.....
5	.....	4	13	8	7	.5	20	.....	17	6.5	5	5	.....
6	.....	4	19	10	7	.5	21	.....	15	6.5	4	5	.....
7	.....	4	17	11	7	.5	22	.....	12	6.5	4	4	.....
8	.....	3	17	16	4	.5	23	.....	11	7	4	3	.....
9	.....	3	17	11	15	.5	24	.....	10	8	5	2	.....
10	.....	5	17	6	6	.5	25	.....	9	8	6	2	.....
11	.....	10	18	8	2	.5	26	1	8	8	6	2	.....
12	.....	17	17	8	3	.3	27	1	4	8	6	17	.....
13	.....	17	17	11	3	.3	28	3	4	8	10	11	.....
14	.....	15	19	7	4	.2	29	4	4	8	7	9	.....
15	.....	15	7	7	4	.2	30	2	3	8	8	3	.....
							31	1	.....	8	.....	2	.....

Mean daily discharge, in second-feet, of Paradise Valley canal near Chinook, Mont., 1904–1917—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Day.	Apr.	May.	June.	July.	Aug.
1906.						1906.					
1	.....	2	16	4.6	5.4	16	6	0.4	.....	10.2	.....
2	.....	2	19.4	5.5	5	17	5	.4	.....	9.1	.....
3	.....	2	19.4	5.5	4.6	18	4.3	.4	.....	11.8	.....
4	.....	1.4	19.4	5.1	4.2	19	2.7	.8	.....	13.4	.....
5	.....	1.2	19.4	4.8	3.4	20	2	.8	.....	12.9	.....
6	.....	1.2	13.8	6	3.4	21	1.4	7.2	.....	9.9	.....
7	.....	1.2	10.6	5	2.8	21	1.4	8.5	.....	8.9	.....
8	0.9	1.2	7.3	4.2	2.6	23	2	4.2	.....	8.8	.....
9	1.2	1.2	.....	3.6	2.2	24	4.3	3	.....	9.3	.....
10	6.0	1.2	.....	13.8	2	25	2	2.7	.....	8.2	.....
11	9.2	.9	.....	10.1	1.5	26	2	5.3	10.8	7.6	.....
12	7.8	.9	.....	9.6	1.2	27	2	9.2	9.9	7	.....
13	9.2	.9	.....	8.5	1	28	1.4	18	8.5	5.9	.....
14	3.8	3.4	.....	6.4	.4	29	2	15.2	9.2	5.1	.....
15	6	2	.....	9.2	.....	30	2	11.6	5	4.6	.....
						31	.....	13.8	.....	4.8	.....

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1907.							1907.						
1	.....	0.1	0	4.6	3.6	2.9	16	4.6	0.3	1.1	6.4	1.4	2.0
2	.....	.....	6.3	4.1	4.9	2.1	17	3.7	.....	1.0	6.4	1.3	2.0
3	.....	.....	9.1	5.9	7.0	2.0	18	3.8	.....	.7	6.1	1.3	1.9
4	.....	.....	6.6	5.2	3.7	2.7	19	2.6	.....	.3	5.5	1.9	2.1
5	.....	.....	2.9	4.5	.8	2.0	20	2.3	.....	.1	5.0	1.0	2.0
6	.....	.....	2.5	3.5	.6	2.3	21	2.5	.....	.....	4.9	.8	1.9
7	.....	.....	1.9	3.2	.4	2.0	22	4.6	4.0	.1	5.1	2.9	1.2
8	.....	.6	2.6	1.8	1.3	2.2	23	5.4	12.2	.....	4.3	2.3	1.8
9	1.8	1.4	2.0	4.1	.9	2.1	24	4.6	.9	.....	6.4	1.0	1.7
10	2.6	4.4	1.6	8.7	1.1	2.3	25	7.0	.....	.....	7.0	6.4	2.0
11	4.7	3.9	1.8	9.7	.9	2.2	26	7.2	.....	.....	5.2	7.2	2.1
12	5.4	4.1	1.1	8.9	1.0	2.0	27	3.9	.....	.....	3.6	1.9	2.3
13	6.6	11.0	.8	9.5	1.2	2.0	28	2.6	.....	2.9	2.8	2.0	2.2
14	7.7	2.8	4.9	9.3	1.3	2.3	29	1.2	.....	2.2	1.6	2.6	2.1
15	6.3	.5	1.7	8.3	1.3	2.0	30	.7	.....	1.4	1.5	1.3	2.0
							31	.3	.....	3.0	4.0	.....	1.8

Day.	Apr.	May.	June.	July.	Aug.	Day.	Apr.	May.	June.	July.	Aug.
1908.						1908.					
1	.....	14	4	10	7	16	18	6	0	7	6
2	.....	13	4	7	6	17	20	7	0	7	6
3	.....	16	3	7	5	18	22	6	0	7	7
4	.....	10	3	9	2	19	20	6	0	7	7
5	7	11	3	8	6	20	20	6	6	7	7
6	7	11	2	5	7	21	19	6	3	7	6
7	5	11	2	22	7	22	18	6	3	7	5
8	9	11	2	9	7	23	20	6	2	7	6
9	2	11	2	8	6	24	20	7	2	7	4
10	1	13	2	8	5	25	20	7	1	7	2
11	3	13	2	7	7	26	20	6	0	7	1
12	3	13	1	7	8	27	22	6	2	7	1
13	1	13	1	7	7	28	22	6	0	7	1
14	7	15	1	7	8	29	22	6	0	7	1
15	20	6	1	7	7	30	14	5	14	7	1
						31	.....	5	.....	6	0

Mean daily discharge, in second-feet, of Paradise Valley canal near Chinook, Mont., 1904–1917—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Day.	Apr.	May.	June.	July.	Aug.
1909.						1909.					
1		10.0	4.2	0.2	13.8	16		4.4	12.1	0	
2		8.3	5.1	2.0	1.7	17		2.2	7.6	0	
3		7.6	0	3.9	8.1	18		16.3	9.6	0	
4		7.2	0	2.3	6.4	19		12.6	18.4	3.9	
5		3.2	0	1.1	4.9	20		10.8	28	.3	
6		11.0	0	12.6	.1	21		13.2	3.4	.1	
7		.2	0	.1	.1	22		14.3	1.9	4.1	
8		14.3	0	.6	0	23		15.1	1.3	14.1	
9		12.6	0	7.0		24		13.7	.7	11.2	
10		12.3	14.4	4.1		25		2.2	.5	9.2	
11		10.0	15.0	9.0		26		1.6	.4	11.9	
12		7.2	13.6	4.2		27		1.2	.4	11.5	
13		4.1	27	.7		28	0	7.2	.4	23.2	
14		4.2	16.2	.7		29	2.2	11.0	.3	3.4	
15		6.6	19.4	.2		30	22.0	10.0	.2	1.2	
						31		5.7		8.0	

Day.	Apr.	May.	June.	July.	Aug.	Day.	Apr.	May.	June.	July.	Aug.
1911.						1911.					
1		9.3	4.0	7.5	10	16		19	12	13	
2		9.3	4.0	3.8	6.0	17		18	12	9.2	
3		15	3.7	16	6.0	18		16	20	11	
4		15	4.0	12	3.9	19		20	12	13	
5		16	4.2	3.9	3.9	20		28	6.8	12	
6		15	4.0	6.8	3.7	21		7.6	.6	8.6	
7		12	2.4	7.0	2.7	22		5	9.5	.5	16
8		6.9	4.2	1.3	4.3	23		11	8.6	3.6	9.5
9		15	5.2	.0	4.1	24		14	9.2	15	7.0
10		18	4.2	11	3.4	25		15	5.4	18	7.0
11		13	5.0	21	.8	26		15	5.2	12	12
12		11	13	17	0	27		15	4.4	32	7.5
13		22	11	15	.4	28		22	5.0	13	2.5
14		15	11	19		29		23	4.8	22	4.5
15		19	7.2	12		30		18	4.2	12	6.2
						31			4.2		11

Day.	July.	Aug.	Day.	July.	Aug.	Day.	July.	Aug.
1912.			1912.			1912.		
1	0.0	2.8	11	2.7	1.8	21	1.9	4.1
2	.6	4.2	12	2.4	1.3	22	2.6	.0
3	1.2	3.7	13	2.1	1.4	23	2.5	
4	.5	3.5	14	3.5	2.1	24	2.8	
5	.0	3.4	15	2.9	2.5	25	3.8	
6	.0	3.2	16	2.8	3.3	26	3.1	
7	.0	3.1	17	2.8	3.0	27	2.7	
8	.0	3.3	18	3.6	2.6	28	1.6	
9	.8	2.9	19	2.6	3.9	29	1.5	
10	2.2	3.0	20	2.6	4.1	30	3.9	
						31	3.4	

Day.	May.	June.	July.	Aug.	Day.	May.	June.	July.	Aug.
1913.					1913.				
1		1.8	6.0	7.4	16	0.1	10	4.9	8.0
2		2.4	5.9	6.6	17	.1	11	3.6	8.2
3		2.2	8.0	6.4	18	.1	7.8	.9	11
4		.9	7.6	5.9	19	3.3	10	1.2	14
5		3.0	8.4	6.0	20	3.0	10	5.9	16
6		7.0	6.8	6.2	21	2.2	12	5.6	8.8
7		11.0	6.4	6.0	22		10	6.6	10
8		9.0	7.4	7.4	23		10	6.0	9.4
9		9.0	5.0	7.0	24		13	5.0	8.6
10		7.0	8.2	7.4	25		12	4.5	7.4
11		9.4	6.8	7.8	26		11	5.0	1.0
12		8.0	5.8	9.6	27		9.2	4.9	.4
13		14	6.2	8.2	28		10	4.3	.6
14		13	4.2	8.6	29		24	7.8	.2
15		13	4.9	8.2	30		11	8.6	.0
					31			7.8	.0

Mean daily discharge, in second-feet, of Paradise Valley canal near Chinook, Mont., 1904–1917—Continued.

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1914.									
1	.....	18	5.5	1.8	16	24	5.8	5.4	.....
2	.....	20	5.6	.6	17	22	5.7	5.1	.....
3	.....	18	8.0	.5	18	18	6.1	5.0	.....
4	.....	17	9.8	.2	19	16	10	4.4	.....
5	.....	15	9.5	.1	20	16	7.5	6.0	.....
6	.....	15	2.1	.1	21	16	9.7	6.8	.....
7	.....	12	3.1	.0	22	17	9.1	3.8	.....
8	.....	11	9.2	.6	23	14	8.5	1.2	.....
9	.....	14	7.2	3.2	24	14	11	2.8	.....
10	0.5	16	7.6	3.0	25	5.5	9.1	5.0	.....
11	.3	7.7	7.7	1.3	26	11	9.9	3.1	.....
12	16	7.2	4.0	.0	27	11	11	.8	.....
13	13	6.8	1.0	.....	28	12	11	1.2	.....
14	9.5	7.2	.0	.....	29	12	9.4	2.0	.....
15	23	6.3	1.7	.....	30	11	7.2	2.1	.....
					31	.....	5.8	.....	.....

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1915.													
1	.....	10.8	10.8	2.6	4.6	0.00	16	.....	10.6	7.9	3.1	0.08	0.18
2	.....	7.0	8.6	2.5	2.0	.00	17	.....	10.6	7.6	2.0	.07	.22
3	.....	6.0	6.6	2.5	2.0	.01	18	.....	9.0	9.0	3.2	.07	.30
4	.....	6.8	7.3	2.0	2.4	.04	19	.....	10.2	9.7	3.2	.50	.24
5	.....	6.0	7.1	6.6	.90	.04	20	.....	11.0	10.6	2.9	.38	.22
6	.....	7.4	7.6	5.6	.24	.03	21	.....	8.4	12.8	2.0	.12	.22
7	.....	5.4	8.4	5.4	.27	.00	22	.....	10.2	5.0	1.6	.90	.22
8	.....	5.3	9.0	6.0	.26	.04	23	.....	5.8	7.4	1.1	.66	.21
9	.....	6.5	8.1	3.8	.26	.90	24	.....	9.0	7.6	1.1	.28	.18
10	.....	16.4	6.3	2.6	.22	1.2	25	.....	8.1	8.3	.8	.16	.06
11	.....	13.2	7.4	2.5	.22	.70	26	1.1	7.8	7.6	.4	.15	.09
12	.....	14.2	6.8	2.5	.21	.34	27	8.3	7.6	4.6	.4	.14	.05
13	.....	13.2	5.8	1.9	.21	.24	28	17.8	7.6	2.6	1.5	.08	.04
14	.....	14.2	9.7	1.9	.08	.20	29	19.2	7.6	2.2	1.8	.01	.06
15	.....	11.6	7.9	3.5	.08	.18	30	9.3	9.3	10.2	1.7	.00	.09
							31	.....	8.4	.....	4.2	.00	.....

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1916.														
1	.....	6.7	10.5	3.6	11	.....	6.1	7.2	0.7	21	.....	7.8	2.6	.....
2	.....	6.5	11.0	3.7	12	.....	7.3	7.7	.3	22	.....	7.3	1.1	.....
3	.....	5.5	11.2	4.1	13	.....	8.0	7.6	.1	23	.....	7.6	2.0	.....
4	.....	5.6	10.8	4.2	14	.....	7.5	7.4	.....	24	.....	8.2	2.9	.....
5	.....	5.6	8.9	2.3	15	.....	7.2	8.6	.1	25	.....	9.1	2.2	.....
6	.....	5.3	8.9	3.0	16	.....	7.2	4.8	.....	26	0.4	11.7	2.2	.....
7	.....	4.4	9.3	3.1	17	.....	7.5	3.8	.....	27	7.6	7.8	2.8	2.9
8	.....	6.0	8.6	1.3	18	.....	7.8	2.9	.....	28	6.9	10.3	3.0	4.3
9	.....	6.2	8.9	1.0	19	.....	7.9	2.1	5.8	29	6.7	8.4	5.0	.....
10	.....	6.1	8.9	.8	20	.....	8.3	1.5	1.5	30	8.2	10.0	3.8	.....
										31	.....	10.3	.....	.....

Mean daily discharge, in second-feet, of Paradise Valley canal near Chinook, Mont., 1904–1917—Continued.

Day.	June.	July.	Aug.	Sept.	Day.	June.	July.	Aug.	Sept.
1917.									
1		6.8	10.6	4.3	16	0.1	9.4	8.9	2.6
2		6.0	11.3	5.2	17		10.3	8.9	2.6
3		4.6	11.6	5.6	18		11.8	8.7	2.4
4		6.8	11.6	6.5	19		12.1	8.5	2.0
5		7.3	11.6	7.2	20		11.4	9.6	1.4
6		8.6	11.8	7.2	21		10.2	6.9	.7
7		8.6	11.8	10.2	22	.5	8.6	6.8	
8		7.3	11.9	7.8	23	4.6	8.7	5.9	
9		8.6	9.7	7.0	24	.8	8.5	5.8	
10		7.7	9.9	6.8	25	.6	5.8	4.9	
11		6.6	10.0	7.4	26	.9	7.3	4.3	8.9
12		6.0	9.2	8.1	27	8.6	11.0	3.5	1.5
13		9.4	9.6	4.7	28	8.1	11.4	3.2	
14		11.5	8.2	2.4	29	8.0	11.4	4.5	
15		10.3	8.9	2.3	30	7.0	11.3	4.7	
					31		11.0	4.2	

NOTE.—1903: Estimates of daily and monthly discharge were not prepared on account of insufficient discharge measurements. (See table of discharge measurements and gage-height table.)
1904: Head gates opened May 11 and closed Oct. 21.
1906: No flow June 9–25, nor after Aug. 15. Original estimates of daily discharge for 1906 were lost, and those given were computed from the published gage heights and monthly discharge.
1910: The diversion dam was destroyed by the high water in the spring of 1910 and no water was diverted that year.
1911: Head gates opened Apr. 22 and closed Aug. 14.
1912: Gates opened July 2 and closed Aug. 22. No flow July 5–8, 1912, on account of damage to crest of diversion dam caused by high water.
1913: Apr. 6 to May 15 the head gates were closed, but a small amount of water leaked through, estimated for the period Apr. 6–20 at 0.1 second-foot. May 16–31, the water came from waste water of Cook canal. May 16–18 and 22–31 this was estimated at 0.1 second-foot. The head gates were opened May 31 and closed Aug. 25. A small amount of water leaked through the head gates after this date.
1914: Canal was practically dry after July 11.
1915: Water turned into canal Apr. 26; mean discharge estimated at one-half the measured discharge for that date.
1916: No flow before Apr. 26 nor after July 31.
1917: Water standing in pools June 5–15, 17–21, Sept. 22–25 and 29–30.

Monthly discharge of Paradise Valley canal near Chinook, Mont., 1904–1917.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1904.				
May 11–31	16	0	8	333
June	15	0	4	238
July	10	2.5	8	492
August	6	0	3	184
October 11–20	2	0	1	20
The period				1,267
1905.				
March 26–31	4	1	2	24
April	17	.5	9	536
May	19	4	10	615
June	16	4	7	417
July	17	2	6	369
August	1	.1	.4	13
The period				1,974
1906.				
April 8–30	9.2	.9	3.7	169
May	18.0	.4	4.0	246
June	19.4	.0	5.6	333
July	13.8	3.6	7.7	474
August 1–15	5.4	0	2.7	80
The period				1,300

Monthly discharge of Paradise Valley canal near Chinook, Mont., 1904–1917—Con.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1907.				
May 9–31	7.7	0.3	4.00	182
June	12.2	0	1.54	92
July	9.1	0	1.89	116
August	9.7	1.5	5.38	331
September	7.2	.4	2.18	130
October	2.9	1.2	2.07	127
The period				978
1908.				
April 5–30	22	1	13.9	717
May	16	5	8.97	552
June	14	0	2.20	131
July	22	5	7.71	474
August	8	0	5.03	309
The period				2,180
1909.				
May	16.3	.2	8.40	516
June	28	0	6.67	397
July	23.2	0	4.86	299
August 1–7	13.8	.1	5.01	69.6
The period				1,280
1911.				
April 22–30	23	5	15.3	273
May	28	4.2	12.3	756
June	32	.5	9.29	553
July	21	0	9.78	601
August	10	0	1.55	95.3
The period				2,280
1912.				
July	3.9	0	2.04	125
August	4.2	0	2.04	125
The period				250
1913.				
April 6–20			.1	3
May 16–31	3.3		.61	19
June	24	.9	9.39	559
July	8.6	.9	5.81	357
August	16		6.85	421
The period				1,360
1914.				
April 10–30	24	.3	13.4	558
May	20	5.7	10.6	652
June	9.8	0	4.56	271
July 1–12	3.2	0	.95	22.6
The period				1,500
1915.				
April 26–30	19.2	1.1	11.1	110
May	16.4	5.3	9.20	556
June	12.8	2.2	7.68	457
July	6.6	.4	2.67	164
August	4.6	0	.566	35
September	1.2	0	.210	12
The period				340
1916.				
April	8.2	.4	5.96	59
May	11.7	4.4	7.46	459
June	11.2	1.1	5.94	353
July	5.8	0	1.38	85
The period				956
1917.				
June 5–30	8.6	0	1.51	77.9
July	12.1	4.6	8.91	548
August	11.9	3.2	8.29	510
September	10.2	0	3.83	228
The period				1,360

Monthly discharge, in acre-feet, of Paradise Valley canal near Chinook, Mont., 1904–1917.

	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Total.
1904	.....	.....	333	238	492	184	.....	20	1,270
1905	24	536	615	417	369	13	.....	.....	1,970
1906	.....	169	246	333	474	80	.....	.....	1,300
1907	.....	.....	182	92	116	331	130	127	978
1908	.....	717	552	131	474	309	.....	.....	2,180
1909	.....	.....	516	397	299	70	.....	.....	1,280
1911	.....	273	756	553	601	95	.....	.....	2,280
1912	.....	.....	.....	.....	125	125	.....	.....	250
1913	.....	3	19	559	357	421	.....	.....	1,360
1914	.....	558	652	271	23	.....	.....	.....	1,500
1915	.....	110	566	457	164	35	12	.....	1,340
1916	.....	59	459	353	85	.....	.....	.....	956
1917	.....	.....	.....	78	548	510	228	.....	1,360
Average	.....	202	377	298	317	167	.....	.....	1,390

NOTE.—In computing the average flow during the months of April to August, inclusive, the canal was assumed dry when no discharge was recorded. April, 1904, which was previous to the establishment of the station, was omitted in computing the average.

HARLEM CANAL NEAR ZURICH, MONT.

LOCATION.—In SW. ¼ sec. 33, T. 33 N., R. 21 E., about 500 feet below head gates on Milk River, and 1½ miles southeast of Zurich, in Blaine County.

RECORDS AVAILABLE.—June, 1903, to December 31, 1917.

GAGE.—Vertical staff on right bank, 500 feet below head gates.

DISCHARGE MEASUREMENTS.—Made by wading 10 feet above gage.

CHANNEL AND CONTROL.—Bed of canal is earth; no definite control. Check weirs several miles below gage may cause some backwater at high stages. Aquatic plants growing in canal during the irrigating season and the large amount of silt deposited also cause backwater.

ACCURACY.—Stage-discharge relation not permanent. Sufficient discharge measurements are necessary each year to define changes in the rating due to growth of vegetation and deposition of silt. Daily gage heights are mean of two readings daily. Records fair.

Discharge measurements of Harlem canal near Zurich, Mont., 1903–1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1903.		*Feet.*	*Sec.-ft.*	1906.		*Feet.*	*Sec.-ft.*
June 27	A. E. Place	2.28	37.1	Apr. 19	Freeman and Morse	2.16	40.7
July 27	E. W. Myers	1.89	31.2	23	do	.95	8.6
27	do	1.89	31.4	May 5	W. B. Freeman	.25	.25
Aug. 19	A. E. Place	.85	4.0	23	do	2.13	35.3
1904.				1908.			
May 18	L. R. Stockman	2.62	49.6	Apr. 27	A. F. Huch	3.64	65.7
July 1	Robert Follansbee	1.60	24.0	May 6	do	3.71	67.3
Aug. 8	W. B. Freeman	.58	1.0	15	Stewart and Huch	3.55	61.1
1905.				25	A. F. Huch	3.70	57.7
Apr. 8	L. R. Stockman	1.35	10.5	June 2	do	4.08	78.7
24	Stockman and Morse	1.12	15.0	12	do	3.26	44.7
May 17	H. M. Morse	1.38	19.0	24	do	1.30	3.3
June 3	do	1.58	19.0	July 6	do	2.49	27.4
17	Stockman and Prall	.98	7.3	17	do	3.00	31.0
24	C. T. Prall	.68	2.5	Aug. 6	do	2.41	20.6
July 8	Freeman and Morse	2.21	26.0	1909.			
15	C. T. Prall	1.35	10.0	Apr. 21	Stewart and Lamb	3.13	70
21	W. B. Freeman	1.05	5.3	May 3	W. A. Lamb	3.25	77
27	H. M. Morse	2.96	51.0	18	do	3.20	74
Aug. 5	W. B. Freeman	.45	1.2	June 9	do	1.85	32
11	H. M. Morse	1.37	14.0	26	do	.20	0
1906.				Aug. 1	do	1.10	8.9
Apr. 6	W. B. Freeman	.48	.90	20	do	.40	.5
9	do	2.20	40.2				

Discharge measurements of Harlem canal near Zurich, Mont., 1903–1917—Continued.

Date.	Made by—	Gage height.	Discharge.
1910.		*Feet.*	*Sec.-ft.*
Apr. 29	M. E. McChristie	2.65	52
May 6	do	2.60	52
16	do	2.95	60
20	do	3.10	62
20	do	3.10	65
25	do	3.09	60
25	do	3.09	63
June 4	do	1.83	38
1911.			
Apr. 12	J. C. Beebe	2.12	24
24	do	3.79	67
May 2	do	3.85	70
9	do	3.70	69
13	do	3.94	82
20	do	3.90	72
26	do	2.65	28
June 11	do	1.61	33
22	do	2.79	33
29	do	3.31	50
July 5	do	3.14	40
8	do	1.78	5.2
Aug. 1	do	1.08	2.9
1912.			
May 17	R. R. Randall	1.90	14.4
June 3	do	1.22	2.9
14	do	2.31	21
25	do	1.70	6.8
July 25	do	3.08	18.6
Aug. 28	do	1.60	1.4
1913.			
Apr. 25	J. B. Stewart	2.48	30
May 16	do	3.02	41
30	do	3.40	41
June 16	do	3.68	35
July 3	do	3.00	6.7
1914.		*Feet.*	*Sec.-ft.*
Apr. 29	B. E. Jones	3.57	57
May 4	do	3.65	65
9	do	3.37	54
16	do	3.83	63
25	do	2.65	26
June 2	do	2.03	8.1
8	do	2.84	23
20	do	3.48	39
30	do	2.96	22
July 7	W. Arthurs	1.55	.3
1915.			
Apr. 13	B. E. Jones	2.95	53
26	do	3.13	54
May 3	do	2.71	41
10	do	2.20	26
18	do	3.18	47
June 2	do	3.01	40
12	do	2.22	15.4
19	do	1.84	13
29	do	2.05	16.3
July 6	do	2.04	14.8
7	do	2.31	20
22	do	1.61	9.3
Aug. 2	do	1.23	4.2
1916.			
Apr. 25	A. H. Tuttle	3.25	48.7
May 3	do	3.60	57
14	do	3.24	47.3
June 16	do	2.48	24.7
1917.			
May 22	A. H. Tuttle	3.64	47.6
June 4	do	3.35	39.4
18	do	3.71	45.4
23	do	3.78	44.6
July 14	do	4.50	82
Aug. 1	do	4.30	42.5
9	do	4.08	37.8

NOTE.—1905: Aug. 5, discharge is leakage through head gates.
1906: May 5, discharge estimated.
1914: July 7, discharge estimated.
1915: June 12, stage fell 0.04 foot in 0.2 hour during measurement; discharge corrected for changing stage 19.6 second-feet. June 29, stage rose 0.02 foot in 0.3 hour during measurement; discharge corrected for changing stage 15.2 second-feet. July 7, stage fell 0.02 foot in 0.4 hour during measurement: discharge corrected for changing stage 22 second-feet.
1917: Aug. 1 and 9, stage discharge relation affected by backwater from checks below gage.

Daily discharge, in second-feet, of Harlem canal near Zurich, Mont., 1904–1917.

Day.	May.	June.	July.	Aug.	Day.	May.	June.	July.	Aug.
1904.					1904.				
1		50	21	2	16	33	33	4	0
2		56	18	2	17	36	30	6	0
3		51	15	1	18	47	33	6	0
4		52	8	1	19	47	33	4	0
5		51	6	1	20	44	29	4	0
6		50	3	0	21	39	30	4	
7		45	1	1	22	34	29	2	
8		41	1	1	23	37	28	2	
9		39	1	1	24	42	15	1	
10		39	1	1	25	47	16	1	
11	28	39	1	1	26	50	17	0	
12	30	39	1	1	27	48	20	0	
13	33	42	1	1	28	47	21	0	
14	36	47	2	0	29	47	24	1	
15	33	33	2	0	30	48	28	2	
					31	50		2	

Daily discharge, in second-feet, of Harlem canal near Zurich, Mont., 1904–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Day.	Mar.	Apr.	May.	June.	July.	Aug.
1905.							1905.						
1	.....	21	12	19	15	18	16	25	30	18	9	8	5
2	.....	21	10	19	19	0	17	0	30	15	7	7	4
3	.....	21	10	19	22	0	18	0	27	14	6	6	26
4	.....	14	8	17	25	0	19	28	23	14	4	5	5
5	28	12	8	13	28	1	20	28	20	9	4	5	0
6	28	12	14	8	24	15	21	30	19	7	4	5	.....
7	30	10	17	6	28	11	22	34	17	8	4	5	.....
8	30	10	21	10	30	11	23	28	15	10	3	4	.....
9	32	6	25	13	30	15	24	28	14	12	3	3	.....
10	30	6	27	19	31	17	25	27	14	14	3	3	.....
11	30	16	27	15	24	14	26	23	15	13	2	15	.....
12	36	32	26	11	21	12	27	23	15	15	2	48	.....
13	38	32	25	10	18	11	28	23	14	16	5	73	.....
14	34	32	23	13	13	10	29	25	12	17	10	56	.....
15	0	30	23	10	11	7	30	25	12	19	13	26	.....
							31	25	.....	19	.....	21	.....

Day.	Apr.	May.	June.	Day.	Apr.	May.	June.	Day.	Apr.	May.	June.
1906.				1906.				1906.			
1	.....	0.3	80	11	34	0.3	.....	21	20	10	.....
2	.....	.3	65	12	43	.3	.....	22	20	10	.....
3	.....	.3	40	13	40	68	.....	23	10	32	.....
4	.....	.3	34	14	5	36	.....	24	2	34	.....
5	.....	.3	80	15	5	8	.....	25	2	31	.....
6	.....	.3	61	16	53	1	.....	26	.3	28	.....
7	.....	.3	22	17	5	1	.....	27	.3	53	.....
8	.....	.3	.....	18	3	1	.....	28	.3	63	.....
9	40	.3	.....	19	40	2	.....	29	.3	87	.....
10	36	.3	.....	20	36	10	.....	30	.3	91	.....
								31	.....	87	.....

Day.	Apr.	May.	June.	July.	Aug.	Day.	Apr.	May.	June.	July.	Aug.
1908.						1908.					
1	.....	63	68	14	24	16	46	62	29	31	10
2	.....	63	79	16	23	17	56	62	26	31	10
3	.....	60	64	20	22	18	63	62	22	31	10
4	.....	60	56	23	22	19	63	78	19	31	10
5	.....	60	54	26	21	20	67	78	16	31	10
6	.....	63	53	30	21	21	60	53	13	30	10
7	36	67	52	30	21	22	56	53	10	30	10
8	43	63	50	30	20	23	56	53	6	30	10
9	46	60	49	30	20	24	63	50	3	30	10
10	43	60	48	30	20	25	63	58	4	29	10
11	16	56	46	30	15	26	60	57	6	28	5
12	12	60	45	30	15	27	64	53	8	27	5
13	14	60	40	31	15	28	71	53	10	26	5
14	16	60	36	31	15	29	67	53	11	26	5
15	28	60	32	31	15	30	67	57	12	25	5
						31	.....	57	.....	25	5

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Day.	Mar.	Apr.	May.	June.	July.	Aug.
1909.							1909.						
1	.....	81	77	0	0	9.0	16	.....	71	68	42	17.5	.....
2	.....	84	77	51	0	7.2	17	.....	68	64	42	10.9	.....
3	.....	84	74	51	0	7.2	18	.....	71	68	64	7.2	.....
4	.....	81	74	54	0	.....	19	.....	71	71	64	7.2	.....
5	.....	68	68	51	0	.....	20	.....	71	74	68	9.0	.....
6	.....	64	42	51	59	.....	21	.....	74	74	64	72	.....
7	.....	64	36	36	59	.....	22	.....	74	68	0	72	.....
8	.....	64	74	36	55	.....	23	.....	74	74	0	10.9	.....
9	.....	68	77	33	49	.....	24	.....	71	71	0	10.9	.....
10	.....	68	74	33	37	.....	25	.....	74	0	0	10.9	.....
11	.....	64	74	30	31	.....	26	.....	74	0	0	9.0	.....
12	.....	64	71	33	26	.....	27	.....	77	0	0	10.9	.....
13	.....	58	68	39	31	.....	28	36	77	0	0	37	.....
14	.....	58	61	45	26	.....	29	48	77	0	0	31	.....
15	.....	68	68	45	20	.....	30	58	81	0	0	12.9	.....
							31	71	.....	0	.....	10.9	.....

Daily discharge, in second-feet, of Harlem canal near Zurich, Mont., 1904–1917—Continued.

Day.	Mar.	Apr.	May.	June.	Day.	Mar.	Apr.	May.	June.
1910.					1910.				
1	.....	62	54	51	16	67	67	60	.....
2	.....	62	51	51	17	65	67	62	.....
3	.....	59	54	51	18	65	67	67	.....
4	.....	59	54	44	19	62	65	65	.....
5	.....	56	54	42	20	62	65	65	.....
6	.....	59	54	42	21	59	65	69	.....
7	.....	59	56	44	22	59	65	65	.....
8	.....	59	56	44	23	56	62	62	.....
9	.....	54	56	44	24	56	62	65	.....
10	59	54	54	42	25	59	62	63	.....
11	62	51	51	.....	26	56	59	67	.....
12	62	56	51	.....	27	59	59	62	.....
13	65	62	56	.....	28	62	56	62	.....
14	62	65	62	.....	29	62	54	59	.....
15	65	65	62	.....	30	62	54	57	.....
					31	65	.....	56	.....

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Day.	Mar.	Apr.	May.	June.	July.	Aug.
1911.							1911.						
1	.....	78	70	38	60	3	16	.....	73	77	40	12	5
2	.....	70	72	38	62	3	17	.....	75	73	38	14	5
3	.....	49	72	39	58	3	18	.....	75	68	47	14	5
4	.....	40	72	39	56	3	19	13	73	68	48	15	5
5	.....	22	70	43	40	3	20	34	72	72	45	15	4
6	.....	22	70	41	37	3	21	39	72	66	38	15	4
7	.....	70	71	43	0	3	22	42	74	64	34	17	4
8	.....	70	73	41	0	4	23	42	72	64	32	17	.....
9	.....	78	68	36	25	5	24	46	69	61	40	17	.....
10	.....	76	73	36	37	5	25	63	69	59	43	16	.....
11	.....	74	73	34	40	5	26	63	71	30	61	13	.....
12	.....	74	73	30	38	6	27	67	73	27	57	7	.....
13	.....	70	82	30	32	6	28	74	72	31	56	5	.....
14	.....	56	79	42	19	6	29	74	68	31	50	5	.....
15	.....	61	79	40	14	5	30	78	70	31	59	4	.....
							31	78	.....	40	.....	4	.....

Day.	Mar.	May.	June.	July.	Aug.	Sept.	Day.	Mar.	May.	June.	July.	Aug.	Sept.
1912.							1912.						
1	.....	.....	20	11	25	1.1	16	.....	14	5.0	16	2.0	0.7
2	.....	.....	5.5	16	25	1.0	17	.....	14	5.0	16	2.0	.7
3	.....	.....	3.3	22	23	.8	18	.....	14	5.0	17	2.0	.6
4	.....	.....	3.3	22	23	.8	19	.....	14	5.5	19	2.0	.5
5	.....	.....	3.2	10	5.0	.8	20	.....	13	5.5	14	2.0	.4
6	.....	.....	16	8.5	5.0	.8	21	.....	24	5.5	14	1.5	.4
7	.....	.....	16	8.5	4.5	.8	22	.....	24	5.5	22	1.5	.2
8	.....	10	16	6.0	4.5	.8	23	.....	25	8.0	21	1.5	.3
9	.....	11	24	6.0	4.5	.8	24	.....	25	7.5	21	1.5	.4
10	.....	13	23	6.0	4.0	.8	25	.....	26	7.0	19	1.5	.5
11	.....	14	22	19	4.0	.8	26	16	26	6.5	21	1.5	.6
12	.....	14	23	17	4.0	.8	27	18	25	7.5	21	1.5	.4
13	.....	14	22	12	2.5	.8	28	22	24	7.5	18	1.5	.3
14	.....	14	22	12	2.5	.8	29	30	22	9.5	8	1.4	.3
15	.....	14	22	19	2.5	.8	30	39	21	11	10	1.3	.4
							31	49	21	.....	23	1.2	.....

Daily discharge, in second-feet, of Harlem canal near Zurich, Mont., 1904–1917—Continued.

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1913.					1913.				
1	.....	27	44	10	16	.....	42	35	20
2	.....	28	45	6.7	17	.....	43	34	23
3	.....	32	46	6.7	18	.....	42	32	24
4	.....	30	42	6.4	19	.....	44	28	20
5	.....	29	39	4.9	20	22	47	31	13
6	.....	30	37	3.0	21	20	42	33	11
7	.....	27	38	1.9	22	20	48	33	12
8	.....	27	36	1.1	23	22	47	29	17
9	.....	33	38	2.0	24	22	45	28	11
10	.....	38	37	8.5	25	25	43	25	9.7
11	.....	39	38	8.2	26	29	44	20	8.2
12	.....	42	38	5.1	27	29	42	17	5.0
13	.....	43	38	25	28	27	41	13	4.5
14	.....	48	38	28	29	27	42	6	3.3
15	.....	54	38	23	30	28	41	2	1.5
					31	.....	42	.....	.5

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1914.					1914.				
1	8	55	11	21	16	48	62	47	.....
2	46	63	6.8	22	17	46	64	43	.....
3	44	67	3.8	16	18	49	62	39	.....
4	40	66	2.7	8.5	19	46	61	38	.....
5	43	45	1.8	4.5	20	53	53	35	.....
6	36	69	2.8	1.5	21	44	47	36	.....
7	41	66	6.1	.4	22	40	40	27	.....
8	43	59	20	.0	23	40	29	14	.....
9	33	52	39	.0	24	55	27	7.6	.....
10	37	51	50	.0	25	60	26	7.2	.....
11	36	60	47	.....	26	53	21	9.2	.....
12	42	63	48	.....	27	65	19	9.2	.....
13	45	61	46	.....	28	55	20	12	.....
14	38	64	46	.....	29	64	21	18	.....
15	38	60	49	.....	30	61	18	21	.....
					31	.....	14	.....	.....

Day.	Apr.	May.	June.	July.	Aug.	Day.	Apr.	May.	June.	July.	Aug.
1915.						1915.					
1	.....	44	14.0	23	8.9	16	60	43	28	7.4	.....
2	.....	42	25	24	4.1	17	57	46	20	9.4	.....
3	.....	40	38	24	4.0	18	52	49	15.4	8.5	.....
4	.....	38	39	16.6	4.0	19	48	47	12.5	9.1	.....
5	.....	36	31	16.6	2.1	20	57	49	12.5	8.2	.....
6	.....	34	28	18.6	.....	21	62	50	12.5	10.1	.....
7	.....	32	30	22	.....	22	60	50	11.0	9.1	.....
8	68	30	33	13.0	.....	23	57	48	11.0	8.0	.....
9	46	29	28	7.8	.....	24	54	48	11.0	10.5	.....
10	60	27	27	7.5	.....	25	54	45	11.0	8.2	.....
11	52	35	26	9.6	.....	26	55	39	11.0	7.6	.....
12	48	32	22	12.7	.....	27	50	45	11.0	5.9	.....
13	51	30	25	11.4	.....	28	38	48	11.0	5.2	.....
14	46	35	34	12.5	.....	29	38	45	16.0	3.6	.....
15	52	36	34	10.1	.....	30	46	47	20	2.4	.....
						31	.....	28	.....	5.3	.....

Daily discharge, in second feet, of Harlem canal near Zurich, Mont., 1904–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Day.	Mar.	Apr.	May.	June.	July.
1916.						1916.					
1	.....	6.9	55	40	5.3	16	.....	40	48	26	.....
2	.....	26	61	40	4.0	17	.....	46	48	3.3	.....
3	.....	30	57	40	3.6	18	.....	60	48	3.3	.....
4	.....	19	57	40	3.8	19	.....	55	48	10	.....
5	.....	29	59	42	3.3	20	.....	49	53	9.6	.....
6	.....	20	58	33	3.6	21	.....	48	53	9.5	.....
7	.....	32	59	.....	3.0	22	.....	48	49	9.1	.....
8	.....	30	55	30	2.4	23	.....	50	51	9.4	.....
9	.....	27	44	32	.....	24	.....	51	52	9.6	.....
10	.....	26	44	34	.....	25	.....	44	44	8.8	.....
11	.....	29	50	33	.....	26	.....	36	37	8.9	.....
12	.....	32	46	33	.....	27	.....	47	36	8.7	.....
13	.....	34	45	33	.....	28	.....	59	36	6.9	.....
14	.....	39	49	32	.....	29	.....	54	31	6.3	.....
15	.....	41	49	31	.....	30	.....	53	32	6.5	.....
						31	8.2	.....	38	.....	.....

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1917.							1917.						
1	.....	36	45	47	43	32	16	.....	47	53	81	27	31
2	.....	39	50	43	42	32	17	.....	48	53	69	27	31
3	.....	46	49	53	42	30	18	.....	48	47	53	27	29
4	.....	38	43	56	40	23	19	4.0	46	44	66	28	29
5	.....	41	38	63	40	28	20	3.2	50	35	66	23	30
6	.....	46	38	65	40	33	21	3.5	49	29	65	22	31
7	.....	42	36	72	41	35	22	2.8	46	30	67	20	30
8	.....	40	31	71	40	34	23	2.8	46	45	65	20	28
9	.....	46	27	73	38	33	24	2.9	44	44	66	20	28
10	.....	40	25	88	38	29	25	2.8	43	42	67	20	30
11	.....	31	24	90	38	29	26	2.2	49	30	62	20	44
12	.....	28	24	89	25	28	27	2.2	45	29	43	20	30
13	.....	32	24	83	24	27	28	16	40	40	40	16	28
14	.....	39	29	83	34	28	29	22	39	44	32	16	25
15	.....	43	52	81	27	30	30	26	40	47	31	16	16
							31	.....	44	.....	43	22	.....

NOTE.—1904: Canal operated Apr. 1 to Aug. 20, but gage readings not available before May 11.
1906: Head gates opened Apr. 9. Dam washed out June 8.
1907: Canal not used.
1908: No gage heights recorded June 5 to July 1 nor after July 23: discharge June 5 to July 1 interpolated between measurements. The canal was bank full in June, but the excess was wasted and was not taken into account in these records. Daily discharge July 24 to Aug. 31 estimated from flow of Milk River and canals.
1910: Head gates opened Mar. 10 and closed June 11.
1911: Gates opened Mar. 19 and closed Aug. 22.
1912: The flow in March, 1912, was probably due to overflow from high water in Milk River. Practically no flow after Sept. 30.
1913: Head gates opened Apr. 20 and closed Aug. 1.
1914: Gates opened Mar. 29 and closed July 8.
1915: Discharge interpolated Apr. 23, May 1–2, and May 4–7.
1916: Head gates opened Mar. 31 and closed for season July 8. Gates closed for repairs to dam June 7.
1917: Some water in canal early in April, owing to overflow of head gates: no records obtained. Check gate changed July 28. Head gates closed Sept. 30.

Monthly discharge of Harlem canal near Zurich, Mont., 1904–1917.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1904.				
May 11–31	50	28	41	1,708
June	56	15	35	2,083
July	21	0	4	246
August 1–13	2	0	1	26
The period				4,063
1905.				
March 5–31	38	0	25.5	1,366
April	32	6	18	1,071
May	27	7	16	984
June	19	2	9	536
July	73	3	20	1,230
August 1–19	26	0	10	377
The period				5,564
1906.				
April 9–30	53.0	.3	18.0	785
May	91.0	.3	21.2	1,300
June 1–7	80.0	22.0	54.6	758
The period				2,840
1908.				
April 7–30	71	12	49.0	2,320
May	78	50	59.8	3,680
June	79	3	32.2	1,920
July	31	14	27.8	1,710
August	24	5	13.5	830
The period				10,500
1909.				
April	84	58	71.4	4,250
May	77	0	53.1	3,260
June	68	0	31.1	1,850
July	59	0	19.5	1,200
The period				10,600
1910.				
March 10–31	67	56	61.4	2,680
April	67	51	60.4	3,590
May	69	51	59.1	3,630
June 1–10	51	42	45.5	903
The period				10,800
1911.				
March 19–31	78	13	54.8	1,410
April	78	22	66.3	3,950
May	82	27	63.2	3,890
June	61	30	41.9	2,490
July	62	0	22.8	1,400
August 1–22	6	3	4.3	188
The period				13,300
1912.				
March 26–31	49	16	29.0	345
May 8–31	26	10	18.2	866
June	24	3.2	11.4	678
July	23	6.0	15.3	941
August	25	1.2	5.32	327
September	1.1	.2	.64	38
The period				3,200
1913.				
April 20–30	29	20	24.6	537
May	54	27	39.4	2,420
June	46	2	31.9	1,900
July	28	.5	10.5	646
The period				5,500

Monthly discharge of Harlem canal near Zurich, Mont., 1904–1917—Continued.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1914.				
April	65	8	45.0	2,680
May	69	14	47.9	2,950
June	50	1.8	24.8	1,480
July 1–10	22	0	7.39	147
The period				7,260
1915.				
April 8–30	68	38	52.7	2,400
May	50	27	40.2	2,470
June	39	11	21.6	1,290
July	24	2.4	11.2	689
August 1–5	8.9	2.1	4.62	46
The period				6,900
1916.				
April	60	6.9	38.7	2,300
May	61	31	48.1	2,960
June	42	0	21.0	1,250
July 1–8	5.3	2.4	3.62	57
The period				6,570
1917.				
April 19–30	26	2.2	7.53	179
May	50	28	42.3	2,600
June	53	24	38.2	2,270
July	90	31	63.6	3,910
August	43	16	28.9	1,780
September	44	16	29.7	1,770
The period				12,500

NOTE.—Canal head gate washed out in June, 1906; canal not used in 1907.

Monthly discharge, in acre-feet, of Harlem canal near Zurich, Mont., 1904–1917

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Total.
1904			1,710	2,080	246	26		4,060
1905	1,370	1,070	984	536	1,230	377		5,560
1906		785	1,300	758				2,840
1908		2,330	3,680	1,920	1,710	830		10,500
1909		4,250	3,260	1,850	1,200			10,600
1910	2,680	3,590	3,630	903				10,800
1911	1,410	3,950	3,890	2,490	1,400	188		13,300
1912	345	0	866	678	941	327	38	3,200
1913		537	2,420	1,900	646			5,500
1914		2,680	2,950	1,480	147			7,260
1915		2,400	2,470	1,290	689	46		6,900
1916		2,300	2,960	1,250	57			6,570
1917		179	2,600	2,270	3,910	1,780	1,770	12,500
Average		2,010	2,520	1,490	937	275		7,660

NOTE.—Dam washed out June 8, 1906, and canal was not used again until 1908. In computing the average flow the canal was assumed dry when no discharge was recorded. April, 1904, which was previous to the establishment of the station, was omitted in computing the average.

AGENCY DITCH NEAR HARLEM, MONT.

LOCATION.—In NW. ¼ SW. ¼ sec. 33, T. 32 N., R. 23 E., at spillway about 1,000 feet below highway bridge, half a mile below head gate on Milk River, and 4 miles south of Harlem, in Blaine County. (See Pl. XXIV, *B*.)

RECORDS AVAILABLE.—July 14, 1905, to December 31, 1917.

GAGE.—Vertical staff, enameled face, on right-hand downstream post of check weir at spillway.

DISCHARGE MEASUREMENTS.—Made from bridge.

CHANNEL AND CONTROL.—Bed of canal is earth; backwater is caused by aquatic plants growing in canal during operating season, and also by a check gate 1 mile below station. The amount of backwater caused by the check varies with the quantity of water diverted.

EXTREMES OF DISCHARGE.—Maximum discharge recorded, 128 second-feet May 28, 1916.

ACCURACY.—Control shifting. Numerous discharge measurements are necessary each year to define the rating curves. The shifts are also partly determined from notes by the observer concerning changes in the check gates. Records fair.

The canal takes water from Milk River for the irrigation of lands on the Fort Belknap Indian Reservation. This canal has been given a prior right by a decree of the United States Supreme Court to 125 second-feet of the water of Milk River and tributaries above the point of diversion.

Discharge measurements of Agency ditch near Harlem, Mont., 1905–1917.

Date.	Made by—	Gage height.	Discharge.
1905.		*Feet.*	*Sec.-ft.*
July 14	Prall and Freeman	3.24	24
28	W. B. Freeman	4.82	52
28	do	4.53	63
Aug. 4	C. T. Prall	4.3	29
17	do	3.8	14
25	do	2.5	18
Sept. 5	W. B. Freeman	1.75	2
1906.			
Apr. 10	W. B. Freeman	4.40	49.8
21	Freeman and Morse	3.38	10.6
27	W. B. Freeman	3.76	23.6
May 10	do	4.50	48.1
July 21	Morse and Hartman	4.34	6.5
1907.			
May 18	J. B. Pierson	.....	.0
24	do	.....	.0
July 11	do	2.88	6.9
19	do	4.40	19.2
Aug. 2	do	4.38	.0
27	do	3.90	11.8
Sept. 28	Robert Follansbee	3.72	19.4
1908.			
Apr. 4	A. F. Huch	.33	.0
24	do	2.42	37.2
May 8	do	1.10	17.0
28	do	2.15	37.9
Aug. 11	do	1.40	13.2
1909.			
June 28	W. A. Lamb	2.83	11
1910.			
May 4	M. E. McChristie	4.45	60
14	do	2.05	26
June 6	do	3.75	40
22	do	5.15	48
July 9	do	5.20	29
18	W. A. Lamb	4.95	15
1911.		*Feet.*	*Sec.-ft.*
Apr. 13	J. C. Beebe	3.59	76
26	do	3.21	74
May 5	do	.....	.4
June 22	do	3.98	49
27	do	4.12	56
July 3	do	4.10	83
28	do	.55	.8
1912.			
June 25	R. R. Randell	3.90	33
July 25	do	1.79	4.2
1913.			
May 29	J. B. Stewart	4.60	87
June 1	do	4.50	76
2	Lee Teter	4.55	78
6	do	4.50	70
10	do	4.35	60
15	C. R. Hauke	4.30	58
18	J. B. Stewart	4.15	58
23	Lee Teter	4.35	73
26	do	4.50	57
30	J. B. Stewart	4.83	65
July 1	Lee Teter	3.78	87
9	do	3.35	69
25	do	2.00	26
1914.			
Apr. 10	L. W. Teter	4.00	64
12	do	4.75	88
16	do	4.55	68
20	do	4.65	85
24	do	4.20	62
28	do	3.45	37
29	B. E. Jones	3.81	52
May 1	L. W. Teter	4.00	63
7	B. E. Jones	3.83	53
8	L. W. Teter	3.80	52
14	do	3.45	38
21	do	4.30	28
31	do	4.10	27

Discharge measurements of Agency ditch near Harlem, Mont., 1905–1917—Continued.

Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*
June 5	L. W. Teter	3.25	38
11	B. E. Jones	3.63	72
11	L. W. Teter	3.60	69
15	do	4.00	85
19	do	4.10	63
26	do	4.30	44
July 3	do	3.15	52
6	B. E. Jones	3.28	54
7	do	2.95	43
8	do	2.38	26
8	do	1.92	14.1
1915.			
Apr. 25	L. W. Teter	4.00	49
May 4	do	2.65	15.1
13	B. E. Jones	.....	4.6
14	do	2.17	1.4
18	L. W. Teter	4.50	89
29	do	4.15	81
31	do	3.75	50
1915.			
June 12	B. E. Jones	3.72	52
14	L. W. Teter	3.55	49
23	do	3.45	43
30	do	2.90	24
July 10	do	2.85	21
1916.			
May 2	Tuttle and Marrion	3.98	54
19	A. H. Tuttle	4.19	44
21	Phil. H. Marrion	3.55	51
27	do	5.10	110
June 4	do	4.15	63
21	Tuttle and Marrion	4.98	98
21	Marrion and Tuttle	4.98	99
July 1	Phil. H. Marrion	3.10	21.6
1917.			
June 18	A. H. Tuttle	5.18	33.3
July 14	do	4.55	26.1
Aug. 1	do	4.40	0
9	do	4.49	4.8

NOTE.—1905: July 28, Aug. 4 and 17, stage-discharge relation affected by backwater.
1911: May 5, discharge estimated.
1912: July 25, weir measurement.
1915: May 14, weir measurement. The current-meter measurement of May 13 showed the rate at which water was being pumped from the canal May 10–14, the pump running 24 hours per day.
1916: May 19, check gate in place 1 mile below.

Daily gage height, in feet, of Agency ditch near Harlem, Mont., 1906–1909.

Day.	Apr.	May.	June.	July.	Aug.	Sept.
1906.						
1	.....	4.1	5.7	3.85	3.6	3.8
2	.....	4.37	5.55	3.8	3.6	3.8
3	.....	4.32	5.15	3.7	3.6	3.8
4	.....	4.4	5.0	3.65	3.6	3.8
5	.....	4.4	4.8	3.6	3.6	3.8
6	.....	4.4	4.7	3.5	3.6	3.8
7	.....	4.4	4.55	3.4	3.6	3.8
8	.....	4.4	4.3	3.3	3.6	3.8
9	3.45	4.4	4.05	3.2	3.6	3.9
10	4.4	4.5	3.95	.....	3.6	3.9
11	4.65	4.5	3.85	.....	3.6	3.9
12	4.6	4.65	3.7	.....	3.6	3.9
13	4.35	5.05	3.6	.....	3.5	3.9
14	4.2	5.35	3.5	4.4	3.5	3.9
15	4.2	4.95	3.4	4.45	3.5	3.9
16	4.35	4.65	3.4	4.5	3.5	3.9
1906.						
17	4.2	4.5	3.35	4.5	3.5	3.9
18	4.05	4.5	3.4	4.5	3.5	3.9
19	3.8	4.5	3.85	4.4	3.5	3.9
20	3.58	4.5	4.0	4.4	3.5	3.9
21	3.4	4.7	4.0	4.15	3.5	3.9
22	3.3	4.7	4.0	3.95	3.5	3.9
23	3.22	4.65	4.2	3.7	3.5	3.9
24	3.4	4.6	4.35	3.7	3.5	3.9
25	3.6	4.85	4.25	3.7	3.5	3.9
26	3.68	4.55	4.2	3.7	3.5	3.9
27	3.75	4.25	4.15	3.7	3.5	3.9
28	3.85	4.05	4.0	3.7	3.5	3.9
29	3.9	4.25	4.1	3.7	3.6	3.9
30	4.0	5.65	4.0	3.6	3.7	3.9
31	.....	5.95	.....	3.6	3.8	.....

Day.	June.	July.	Aug.	Sept.
1907.				
1	.....	4.5	4.4	3.9
2	.....	4.5	4.4	3.9
3	.....	4.6	4.4	3.9
4	.....	4.5	4.3	3.9
5	.....	4.45	4.3	3.9
6	.....	4.4	4.3	3.9
7	.....	4.3	4.3	3.9
8	.....	4.35	4.3	4.0
9	.....	4.4	4.3	4.0
10	.....	3.7	4.3	4.0
11	.....	2.8	4.2	4.1
12	.....	4.0	4.2	4.1
13	.....	4.5	4.2	4.1
14	.....	4.8	4.2	4.1
15	.....	4.8	4.2	4.2
1907.				
16	4.6	4.5	4.2	4.2
17	4.7	4.5	4.2	4.2
18	4.7	4.5	4.0	4.2
19	4.65	4.8	4.0	4.0
20	4.5	4.8	4.0	3.8
21	4.5	4.8	4.0	3.8
22	4.4	4.7	4.0	3.7
23	4.5	4.7	4.0	3.7
24	5.35	4.7	4.0	3.7
25	6.6	4.6	4.0	3.7
26	5.5	4.6	3.8	3.7
27	5.5	4.5	3.8	3.7
28	5.35	4.5	3.8	3.7
29	4.5	4.4	3.8	3.7
30	4.5	4.4	3.8	3.7
31	.....	4.4	3.8	3.7

Daily gage height, in feet, of Agency ditch near Harlem, Mont., 1906–1909—Continued.

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1908.					1908.				
1	.....	2.20	2.05	.....	16	.....	.....	.....	3.55
2	.....	2.20	2.25	.....	17	.....	.....	.....	3.6
3	.....	2.20	2.50	.....	18	.....	2.30	.....	3.5
4	.....	1.65	2.75	.....	19	.....	2.45	.....	3.5
5	.....	.....	2.85	.....	20	.....	2.65	.....	3.45
6	.....	.....	2.95	.....	21	.....	2.80	.....	3.4
7	.....	.....	3.00	.....	22	1.30	2.75	.....	3.3
8	.....	.....	3.10	3.45	23	2.45	2.65	.....	3.3
9	.....	.....	3.10	3.5	24	2.60	2.45	.....	3.3
10	.....	.....	3.20	3.6	25	2.50	2.35	.....	3.3
11	.....	.....	3.20	3.7	26	2.45	2.30	.....	3.3
12	.....	.....	3.20	3.75	27	2.25	2.20	.....	3.3
13	.....	.....	.....	3.7	28	2.20	2.10	.....	3.3
14	.....	.....	.....	3.7	29	2.25	2.10	.....	3.3
15	.....	.....	.....	3.6	30	2.15	2.10	.....	3.3
					31	.....	2.10	.....	3.3

Day.	June.	July.	Day.	June.	July.	Day.	June.	July.
1909.			1909.			1909.		
1	.....	.....	11	4.9	2.85	21	.....	2.9
2	.....	.....	12	5.0	2.8	22	.....	2.85
3	.....	.....	13	5.1	2.75	23	.....	2.8
4	.....	2.7	14	5.45	2.8	24	.....	2.85
5	.....	2.8	15	5.3	2.85	25	.....	.....
6	5.25	2.9	16	5.2	2.8	26	.....	.....
7	5.35	2.8	17	5.3	2.85	27	.....	.....
8	5.0	2.75	18	4.85	2.8	28	.....	.....
9	4.9	2.9	19	4.7	2.85	29	.....	.....
10	5.0	2.8	20	5.3	2.75	30	.....	.....
						31	.....	.....

NOTE.—The stage-discharge relation at this station is affected by the regulation of check gates below, and sufficient information in regard to these changes was not obtained in 1906–1909 to allow accurate daily estimates to be made. A rough idea of the discharge can be obtained from these gage heights and the discharge measurements.

Daily discharge, in second-feet, of Agency ditch near Harlem, Mont., 1905 and 1910–1917.

Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.
1905.											
1	0	33	5	11	32	22	0	21	8	8	.....
2	0	29	4	12	32	22	.....	22	8	8	.....
3	0	29	3	13	29	22	.....	23	8	7	.....
4	0	29	3	14	27	19	.....	24	2	6	.....
5	0	25	2	15	16	18	.....	25	1	18	.....
6	0	25	2	16	21	16	.....	26	1	16	.....
7	0	25	1	17	21	14	.....	27	0	14	.....
8	0	25	1	18	16	12	.....	28	63	11	.....
9	32	25	0	19	12	11	.....	29	52	9	.....
10	32	25	0	20	10	9	.....	30	52	7	.....
								31	51	5	.....

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1910.					1910.				
1	.....	60	.....	40	16	60	.....	40	18
2	.....	60	40	40	17	60	.....	40	18
3	.....	60	40	40	18	60	.....	40	16
4	.....	60	40	40	19	60	.....	40	16
5	.....	60	40	40	20	60	.....	40	16
6	.....	60	40	35	21	60	.....	40	16
7	.....	60	40	35	23	60	.....	48	16
8	60	60	40	31	23	60	.....	48	16
9	60	60	40	29	24	60	.....	48	16
10	60	.....	10	29	25	60	.....	48	16
11	60	.....	10	29	26	60	.....	48	16
12	60	.....	10	25	27	60	.....	48	16
13	60	.....	10	25	28	60	.....	45	.....
14	60	.....	10	22	29	60	.....	45	.....
15	60	.....	40	20	30	60	.....	45	.....

Daily discharge, in second-feet, of Agency ditch near Harlem, Mont., 1905 and 1910–1917—Continued.

Day.	Apr.	June.	July.	Day.	Apr.	June.	July.	Day.	Apr.	June.	July.
1911.				1911.				1911.			
1	.....	.....	77	11	.....	.....	71	21	.....	62	.....
2	.....	.....	81	12	.....	.....	70	22	.....	62	.....
3	.....	.....	82	13	.....	67	67	23	.....	48	.....
4	.....	.....	79	14	.....	74	78	24	.....	46	.....
5	.....	.....	71	15	.....	70	68	25	.....	47	.....
6	.....	.....	71	16	.....	66	65	26	74	50	.....
7	.....	.....	77	17	.....	61	62	27	75	59	.....
8	.....	.....	77	18	.....	57	69	28	75	70	.....
9	.....	.....	77	19	.....	60	45	29	73	89	.....
10	.....	.....	78	20	.....	60	.....	30	77	82	.....
								31	.....	.....	.....

Day.	June.	July.	Aug.	Day.	June.	July.	Aug.	Day.	June.	July.	Aug.
1912.				1912.				1912.			
1	.....	35	4	11	.....	31	.....	21	.....	31	.....
2	.....	32	4	12	.....	31	.....	22	.....	31	.....
3	.....	31	4	13	.....	31	.....	23	.....	31	.....
4	.....	35	4	14	.....	31	.....	24	.....	9	.....
5	.....	39	4	15	.....	31	.....	25	33	4	.....
6	.....	39	4	16	.....	31	.....	26	33	4	.....
7	.....	39	4	17	.....	31	.....	27	33	4	.....
8	.....	33	4	18	.....	31	.....	28	33	4	.....
9	.....	31	4	19	.....	31	.....	29	34	4	.....
10	.....	31	.....	20	.....	31	.....	30	34	4	.....
								31	.....	4	.....

Day.	May.	June.	July.	Day.	May.	June.	July.	Day.	May.	June.	July.
1913.				1913.				1913.			
1	.....	76	87	11	.....	55	11	21	.....	70	.....
2	.....	78	60	12	.....	54	.....	22	.....	80	.....
3	.....	77	56	13	.....	54	.....	23	.....	73	.....
4	.....	76	64	14	.....	56	.....	24	.....	67	.....
5	.....	73	67	15	.....	58	.....	25	.....	62	24
6	.....	70	87	16	.....	58	.....	26	.....	51	26
7	.....	70	71	17	.....	58	.....	27	87	57	27
8	.....	70	56	18	.....	58	.....	28	87	30	27
9	.....	60	56	19	.....	62	.....	29	87	30	.....
10	.....	60	26	20	.....	66	.....	30	87	65	.....
								31	76	.....	.....

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1914.					1914.				
1	.....	63	27	42	16	70	28	49	28
2	.....	60	35	38	17	74	27	56	25
3	.....	57	43	42	18	91	27	35	23
4	.....	54	43	52	19	98	27	49	21
5	.....	53	41	54	20	86	28	33	18
6	.....	52	42	55	21	78	28	32	17
7	.....	53	39	42	22	74	27	44	15
8	26	52	29	24	23	70	27	37	14
9	53	51	35	19	24	64	27	40	14
10	58	44	51	21	25	66	27	43	.....
11	98	34	69	31	26	60	28	44	.....
12	90	24	68	34	27	42	27	42	.....
13	93	23	72	34	28	40	28	40	.....
14	86	30	74	34	29	48	27	36	.....
15	68	27	71	34	30	66	25	38	.....
					31	.....	27	.....	.....

Daily discharge, in second-feet, of Agency ditch near Harlem, Mont., 1905 and 1910–1917—Continued.

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1915.					1915.				
1	.....	12	52	23	16	50	58	45	.....
2	.....	13	52	23	17	54	85	44	.....
3	.....	15	52	23	18	54	92	43	.....
4	.....	16	56	22	19	50	84	42	.....
5	.....	14	62	22	20	50	79	42	.....
6	.....	14	59	22	21	52	76	44	.....
7	.....	12	56	22	22	52	78	44	.....
8	.....	11	52	20	23	50	87	43	.....
9	.....	10	47	21	24	52	87	23	.....
10	.....	10	52	22	25	49	87	23	.....
11	.....	6	47	.....	26	46	88	24	.....
12	.....	6	53	.....	27	41	86	24	.....
13	.....	6	48	.....	28	30	84	22	.....
14	30	62	46	.....	29	17	82	22	.....
15	49	56	46	.....	30	15	62	22	.....
					31	.....	56	.....	.....

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1916.					1916.				
1	.....	56	86	22	16	59	47	.....	.....
2	.....	55	62	1	17	55	47	.....	.....
3	.....	59	63	1	18	47	45	.....	.....
4	.....	60	62	.....	19	43	44	0	.....
5	.....	60	0	.....	20	0	64	90	.....
6	78	48	0	.....	21	0	50	94	.....
7	75	50	78	.....	22	66	57	96	.....
8	70	49	84	.....	23	67	64	90	.....
9	67	52	86	.....	24	73	70	95	.....
10	61	56	86	.....	25	80	73	92	.....
11	53	53	0	.....	26	63	78	90	.....
12	47	57	.....	.....	27	53	106	90	.....
13	51	53	.....	.....	28	57	128	98	.....
14	59	49	.....	.....	29	57	98	94	.....
15	60	49	.....	.....	30	57	86	62	.....
					31	.....	92	.....	.....

Day.	June.	July.	Aug.	Day.	June.	July.	Aug.	Day.	June.	July.	Aug.
1917.				1917.				1917.			
1	.....	26	.....	11	.....	20	5	21	8	16	.....
2	.....	32	.....	12	.....	20	.....	22	.....	15	.....
3	.....	32	.....	13	.....	28	.....	23	.....	14	.....
4	.....	28	.....	14	.....	28	.....	24	.....	12	.....
5	.....	24	.....	15	44	20	.....	25	.....	11	.....
6	.....	24	5	16	54	22	.....	26	36	10	.....
7	.....	24	5	17	54	22	.....	27	32	9	.....
8	.....	24	5	18	42	21	.....	28	32	8	.....
9	.....	24	5	19	25	19	.....	29	36	7	.....
10	.....	24	5	20	16	18	.....	30	34	5	.....
								31	.....	.....	.....

NOTE.—1905: July 9–13, discharge estimated. Aug. 26–31, discharge interpolated.

1906–1909: Head gates opened Apr. 9, 1906. Daily and monthly discharge not computed for 1906–1909 owing to uncertainty as to changes in stage-discharge relation due to regulation of the canal. Some idea of the discharge can be obtained by comparing the gage-height records with the discharge measurements made in these years.

1910: Flow estimates from discharge measurements and the following statement supplied by the irrigation engineer in charge: "Canal was opened Apr. 8 and remained constant until May 10, when it was shut down for repairs. Water turned into ditch June 2 and was constant until June 9, when gates were partly closed. June 10–14, discharge estimated. Gates opened June 15; same discharge as before being closed. June 22, gates raised, also flashboards on waste gate. After June 30 discharge decreased on account of river falling. Gates closed July 27."

1911: Head gates opened Mar. 26 and closed for the season July 19. Discharge July 20–31 was leakage through the head gates; estimated at 1 second-foot. Estimate of discharge Mar. 26 to Apr. 25, originally published, has been omitted from compilation because of inadequate base data.

1912: Water turned into canal May 25, but no gage-height observations were made until July 1. Mean flow May 25 to June 24 estimated at 40 second-feet. Discharge June 25–30 and July 26 to Aug. 9 estimated. Head gates closed for season Aug. 9.

1913: Head gates opened May 27 and closed for season July 28. Checks below the gage were changed at frequent intervals during the irrigation season, causing sudden changes in the stage-discharge relation.

Daily discharge May 27 to June 30 estimated from discharge measurements and gage heights. Canal dry July 12–24 and 29–31.

1914: Head gates closed July 24.

1915: May 11–13, little water passing the gage, the larger part being pumped out above; discharge estimated from measurements made May 13 and 14. The measurement made May 14 indicates the water passing the gage.

1916: Check No. 1 placed May 5 at 7 p. m., removed May 19 at 7 p. m., and not used remainder of season. Water turned into canal 3 p. m. Apr. 6 and head gates closed 7.30 p. m. July 3. Canal shut down for repairs Apr. 19–22, May 20 (from 8 a. m. to 4 p. m.), June 5–7, June 10–20. Sluice gate opened June 30.

1917: Canal shut down for repairs June 22–25. Checks removed June 26; date on which they were replaced is uncertain.

Monthly discharge of Agency ditch near Harlem, Mont., 1905 and 1910–1917.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1905.				
July 8–31	63	0	23	1,050
August	33	5	18	1,110
September 1–8	5	1	3	48
The period				2,200
1910.				
Apr. 8–30			60	2,740
May 1–9			60	1,070
June 2–30			37	2,130
July 1–27			25	1,340
The period				7,280
1911.				
April 26–30			74.8	742
May	0	0	.0	0
June	89	0	37.7	2,240
July	82		44.4	2,730
The period				5,710
1912.				
May 25–31			40.0	555
June			38.7	2,300
July			25.3	1,560
August 1–9			4.0	71
The period				4,490
1913.				
May 27–31	87	76	84.8	841
June	80	30	62.7	3,730
July	87	0	24.0	1,480
The period				6,050
1914.				
April 8–30	98	26	69.5	3,170
May	63	23	35.9	2,210
June	74	27	45.2	2,690
July 1–24	55	14	30.5	1,450
The period				9,520
1915.				
April 14–30	54	15	43.6	1,470
May	92	6	49.5	3,040
June	62	22	42.9	2,550
July 1–10	23	20	22.0	436
The period				7,500
1916.				
April 6–30	80	0	55.9	2,770
May	128	44	63.1	3,880
June	98	0	53.3	3,170
July 1–4	22	0	6.0	48
The period				9,870
1917.				
June 15–30	54	0	25.8	819
July	32	0	18.9	1,160
August 1–11	5	0	2.73	59.6
The period				2,040

NOTE.—Estimates of discharge were not prepared for 1906–1909. See footnote to daily gage heights for this period.

The estimates for 1910 and 1912 are very rough and may be considerably in error. See footnote to daily discharge tables and statement under accuracy in station description.

Monthly discharge, in acre-feet, of Agency ditch near Harlem, Mont., 1905 and 1910–1917.

Year.	Apr.	May.	June.	July.	Aug.	Sept.	Total.
1905	.....	.....	.....	1,050	1,110	43	[a] 2,200
1910	2,740	1,070	2,130	1,340	.....	.....	7,280
1911	742	0	2,240	2,730	.....	.....	5,710
1912	.....	555	2,300	1,560	71	.....	4,490
1913	.....	841	3,730	1,480	.....	.....	6,050
1914	3,170	2,210	2,690	1,450	.....	.....	9,520
1915	1,470	3,040	2,550	436	.....	.....	7,500
1916	2,770	3,880	3,170	48	.....	.....	9,870
1917	.....	.....	819	1,160	59.6	.....	2,040
Average	1,360	1,450	2,450	1,250	14	.....	6,560

[a] Not included in average.

NOTE.—In computing the average flow the canal was assumed dry when no discharge was recorded. April, May, and June, 1905, being previous to the establishment of the station, were omitted in computing the average.

DEER CREEK CATTLE CO.'S WEST DITCH NEAR ST. KILDA, ALTA.

LOCATION.—In SW. ¼ sec. 36, T. 1, R. 12 W. fourth meridian.

RECORDS AVAILABLE.—Discharge measurements in April and June 1914; complete records, 1915.

GAGE.—Vertical staff; read by F. W. Webster.

DISCHARGE MEASUREMENTS.—Made by wading or with a weir.

CHANNEL AND CONTROL.—Good banks and bed; control permanent.

ACCURACY.—Stage-discharge relation permanent. Gage read daily to hundredths Rating curve well defined between gage heights 3.49 feet and 3.57 feet. Results fair.

Head gates were open 8 days in May and 11 days in June, 1915. No records were obtainable during 1916 or subsequently, but it is understood that very little, if any, water was diverted through this ditch during 1916 and 1917.

Discharge measurements of Deer Creek Cattle Co.'s west ditch near St. Kilda, Alta., 1914–15.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*	1915.		*Feet.*	*Sec.-ft.*
Apr. 30	J. E. Degnan	3.23	0.118	July 22	W. H. Storey	3.49	1.16
June 20	do	3.30	.118	30	do	Dry.	0
1915				Aug. 8	do	Dry.	0
Mar. 19	W. H. Storey	Dry.	0	17	do	Dry.	0
29	do	Dry.	0	26	do	Dry.	0
Apr. 12	do	Dry.	0	Sept. 3	do	Dry.	0
22	do	Dry.	0	16	do	Dry.	0
May 4	do	Dry.	0	23	do	Dry.	0
19	do	3.57	1.91	Oct. 5	do	Dry.	0
June 15	do	Dry.	0	12	do	Dry.	0
24	do	Dry.	0	20	do	Dry.	0
July 12	do	Dry.	0	29	do	Dry.	0

Daily discharge, in second-feet, of Deer Creek Cattle Co.'s west ditch near St. Kilda, Alta., 1915.

Day.	May.	July.	Day.	May.	July.	Day.	May.	July.
16	.....	.....	21	1.22	2.60	27	.....	1.98
17	1.98	3.30	22	.96	2.60	28	.....	1.98
18	1.98	3.30	23	.96	2.60	29	.....	.....
19	1.98	3.30	24	.96	2.60	30	.....	.....
20	1.22	2.60	25	.....	2.60	31	.....	.....
			26	.....	.....			

NOTE.—Head gates opened May 17 and July 17; head gates closed May 24 and July 27.

Monthly discharge of Deer Creek Cattle Co.'s west ditch near St. Kilda, Alta., 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
May 17–24	1.98	0.96	1.41	22
July 17–27	3.30	1.98	2.60	57
The period	.....	.....	.....	79

DEER CREEK CATTLE CO.'S EAST DITCH NEAR ST. KILDA, ALTA.

LOCATION.—In SW. ¼ sec. 36, T. 1, R. 12 W. fourth meridian.

RECORDS AVAILABLE.—Incomplete records April 1, 1912, to November 23, 1912; two measurements only during October in 1914; complete records, 1915.

GAGE.—Vertical staff; read by F. W. Webster.

DISCHARGE MEASUREMENTS.—Made by wading or with a weir.

CHANNEL AND CONTROL.—Original bed of ditch clay, but now overwashed with sand from Deer Creek, causing continual change in cross section. The banks are not subject to overflow, the surplus water finding its way through the two spillways at dam. Shifting control.

ACCURACY.—Stage-discharge relation very changeable. Gage read once daily to hundredths. Rating curves are fairly well defined. Records considered fair.

The Deer Creek Cattle Co. diverts all the water from Deer Creek through their two ditches except during flood stages. No records obtained during 1917, although it is understood water was diverted and used.

Discharge measurements of Deer Creek Cattle Co.'s east ditch near St. Kilda, Alta., 1912, 1914, and 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1912.		*Feet.*	*Sec.-ft.*	1915.		*Feet.*	*Sec.-ft.*
Apr. 27	J. E. Degnan	2.88	2.85	Apr. 12	W. H. Storey	2.15	0.674
May 6	do	2.82	1.77	22	do	2.10	1.204
22	do	3.14	1.94	22	do	2.10	1.240
29	do	2.97	2.70	May 4	do	1.94	.609
June 11	do	2.70	.44	4	do	1.94	.640
28	do	Dry.	.....	19	do	2.42	5.691
July 3	do	Dry.	.....	19	do	2.42	5.860
18	do	2.27	.309	June 15	do	3.11	5.320
26	do	2.34	.80	15	do	3.11	5.400
Aug. 6	do	2.31	.76	July 12	do	2.19	2.400
28	do	2.16	.084	22	do	1.97	1.020
Oct. 7	do	2.25	.74	30	do	2.40	5.600
18	do	2.66	7.16	Aug. 8	do	2.11	1.690
29	do	2.30	1.74	17	do	1.96	.700
Nov. 14	do	2.09	.19	26	do	1.77	.270
1914.				Sept. 3	do	2.11	.910
				16	do	2.20	.600
Oct. 17	J. E. Degnan	2.40	5.0	23	do	2.11	.590
21	do	2.35	4.0	Oct. 5	do	2.31	1.430
				12	do	2.32	.850
1915.				20	do	2.32	.820
Mar. 19	W. H. Storey	2.23	1.228	29	do	2.27	.920
29	do	2.09	.441				

Daily discharge, in second-feet, of Deer Creek Cattle Co.'s east ditch near St. Kilda, Alta., 1912 and 1915.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1912.									
1		19.25	1.82	1.40	0	4.30		0.23	0.83
2		11.75	1.82	1.56	0	1.10		.59	.83
3		7.50	1.46	1.57	0	1.88		.28	1.10
4		6.45	1.46	1.02	0	1.14		1.00	
5		5.75	1.46	1.14	0	.83			
6		5.75	1.46	1.22	0	.51			
7		5.05	1.06	.72	0	.36		.80	.22
8		5.05	.75	.66	2.28	.29			.22
9		4.70	1.50	.80	.90	.30	0.17		.40
10		1.00	1.22	.74	.46	.31	.12		
11		.80	11.10	.44	.31	.22	.10		
12		.70	.68	.31	.24	.17	.04		
13		.70	.29	.23	1.55	.12	.07		
14		7.50	.14	.44	1.15	.11	.14		.19
15		5.75	.62	2.27	.46	.14	.17		.11
16		1.90	.48	.83	1.30	.48	.14		.09
17		1.90	.70	.64	.46	.42	.14		.07
18		1.90	1.02	.39	.31	.38	.05	7.16	.04
19		1.90	1.14	.39	.69	.55	1.31		.02
20		1.90	1.16	0	.69	.23	.80		.02
21		1.60	2.80	0	.69	.13	.23		.04
22		1.60	2.10	0	.40	.08	1.00		.04
23		1.90	.60	0	2.78	.10	2.31		.07
24		2.20	.60	0	1.02	.13	1.10		
25		2.80	.60	0	1.02	.18	.80		
26		3.40	2.52	0	.72	.22	.80		
27		2.89	2.16	0	.50	.09	.80		
28		2.18	1.82	0	.51	.08	.69		
29		2.18	1.99	0	.28	.28	.69	1.74	
30		2.18	1.70	0	.28	.17	.28	.77	
31			1.40		.22			.83	
1915.									
1		2.70	.65	1.19			.26		
2		2.70	.65	8.00			.57		
3		2.70	.65	8.00			.94		
4		2.50	.65	8.00			.81		
5		2.20	.59	8.00			.81		
6		1.93	.57	8.00	2.50		1.03		
7		1.93	.52	8.00	5.60		1.03		
8		1.08	.50		9.20		.76		
9		1.08	.48		4.50		.68		
10		1.08	.46		6.00		.68		
11		1.08	.05		3.40		.54		
12		.79	.03		2.40				
13		.84	1.23		8.40				
14		.89	1.23		8.40				
15		.95	1.23		4.50				
16		1.49	1.23		4.50				
17		1.57	5.90			.54			
18		1.65	5.90			.65			
19		1.73	5.90			.57			
20		1.00	4.20			.54			
21		1.08	4.20			.46			
22		1.23	4.20			.46			
23		1.23	3.20			.41			
24		1.23	3.20			.35			
25		1.19	2.70			.35			
26		1.10	2.70			.31			
27		.98	2.40			.31			
28		.89	2.20			.30			
29		.78	2.20						
30		.76	2.20						
31	2.7		1.23						

Monthly discharge of Deer Creek Cattle Co.'s east ditch near St. Kilda, Alta., 1912 and 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1912.				
April	19.25	0.70	4.00	238
May	2.80	.14	1.28	79
June	2.27	0	.559	33
July	2.78	0	.62	38
August	4.30	.08	.51	30
September	2.31	.04	.54	32
October	7.16	.23	1.49	92
November 1–23	1.10	.02	.27	12
The period				554
1915.				
March 31	2.70	2.70	2.70	
April	2.70	.76	1.40	83
May	5.90	.03	2.00	123
June 1–7	8.00	1.19	7.00	97
July 6–16	9.20	2.50	5.40	118
August 17–28	.65	.30	4.30	10
September 1–11	1.03	.26	.74	16
The period				452

FORNFEIST DITCH NEAR ST. KILDA, ALTA.

LOCATION.—In SW. ¼ sec. 31, T. 1, R. 11 W. fourth meridian.

RECORDS AVAILABLE.—September 16 to October 31, 1915. Water was diverted during 1916 and 1917 but no records have been obtained.

GAGE.—Vertical staff, read by Julius Fornfeist.

DISCHARGE MEASUREMENTS.—Made by wading or with weir.

CHANNEL AND CONTROL.—Both banks low, grassy, and not liable to overflow. Bed weedy, but not shifting. One channel at all stages. Control permanent.

ACCURACY.—Stage-discharge relation permanent in 1915. Gage read daily to hundredths. Rating curve based on six measurements; well defined between gage height 0.35 foot and 0.70 foot. Daily discharge computed from rating curve. Record fair.

Discharge measurements of Fornfeist ditch near St. Kilda, Alta., 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Sept. 16	W. H. Storey	0.65	0.200	Oct. 12	W. H. Storey		[a]0.194
23	do	.55	.100	21	do		[a].109
Oct. 6	do	.68	.230	29	do		(b)

[a] Measurement made with weir. [b] Small trickle only.

Daily discharge, in second-feet, of Fornfeist ditch near St. Kilda, Alta., 1915.

Day.	Sept.	Oct.	Day.	Sept.	Oct.	Day.	Sept.	Oct.
1		0.10	11		0.23	21	0.11	0.11
2		.10	12		.20	22	.10	.11
3		.16	13		.20	23	.09	.07
4		.16	14		.20	24	.11	.07
5		.16	15		.20	25	.11	.04
6		.23	16	0.20	.15	26	.11	.04
7		.23	17	.15	.15	27	.10	.02
8		.20	18	.15	.15	28	.10	.02
9		.20	19	.14	.15	29	.10	.01
10		.20	20	.11	.11	30	.10	.01
						31		.01

Monthly discharge of Fornfeist ditch near St. Kilda, Alta., 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
September 16–31	0.20	0.09	0.12	4
October	.23	.01	.13	8
The period				12

H. T. CLARKE NORTH DITCH NEAR EAGLE BUTTE, ALTA.

LOCATION.—In SW. ¼ sec. 21, T. 7, R. 3 W. fourth meridian, 430 feet below head gate of irrigation ditch, on Sexton Creek, near Eagle Butte.

REMARKS.—Ditch was used for about 26 days during 1916; gage heights obtained but not sufficient data to compute. Daily discharge was very small.

H. T. CLARKE SOUTH DITCH NEAR EAGLE BUTTE, ALTA.

LOCATION.—In SW. ¼ sec. 21, T. 7, R. 3 W. fourth meridian, 140 feet below intake of ditch on Sexton Creek.

RECORDS AVAILABLE.—Irrigation seasons 1916–17.

GAGE.—Vertical staff. Read by T. S. Clark.

DISCHARGE MEASUREMENTS.—Made by wading or with weir.

CHANNEL AND CONTROL.—Banks about 1.5 feet high; bed composed of sandy loam.

ACCURACY.—Stage-discharge relation permanent. Gage read only at intervals. Daily discharge obtained by applying gage heights to rating table; for days without gage heights daily discharge estimated. Record poor.

Discharge measurements of H. T. Clark south ditch near Eagle Butte, Alta., 1916–17.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1916.		*Feet.*	*Sec.-ft.*	1917.		*Feet.*	*Sec.-ft.*
May 19.	H. W. Rowley	0.69	[a] 0.60	May 23.	T. C. Milligan		0
June 16.	do	Dry.	0	June 20	do	0.51	[a] 0.50
July 11.	do	.45	[a] .24	July 26.	do		0
Aug. 2.	do	Dry.	0	Sept. 17.	do		0
22.	do	Dry.	0				
Sept. 16.	do	.43	[a] .20				
Nov. 6.	do	Dry.	0				

[a] Discharge determined by weir.

Daily discharge, in second-feet, of H. T. Clark south ditch, near Eagle Butte, Alta., 1916–17.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1916.							1916.						
1	.....	[a] 0.84	[a] 1.43	0.44	.....	0.55	16	.....	0.69	0.36	0.56	.....	0.20
2	.....	[a] .90	[a] 1.54	.62	.....	.60	17	.....	.51	.60	.62	.....	.19
3	.....	[a] .96	[a] 1.65	.80	.....	.65	18	.....	.60	.51	.69	.....	.18
4	.....	[a] 1.02	[a] 1.76	.99	.....	.70	19	.....	.60	.60	.56	.....	.17
5	.....	1.10	1.87	.78	.....	.70	20	1.33	[a] .78	[a] .66	.44	.....	.20
6	.....	[a] 1.02	1.23	.57	.....	.37	21	1.30	[a] .96	[a] .72	.....	.....	.24
7	.....	[a] .96	.60	.36	.....	.33	22	[a] 1.29	[a] 1.14	.78	.....	.....	.20
8	.....	[a] .88	.....	.31	.....	.29	23	[a] 1.22	1.33	.68	.....	.....	.20
9	.....	[a] .80	.....	.26	.....	.25	24	[a] 1.15	1.10	.58	.....	0.17	.21
10	.....	.69	.....	.22	.....	.21	25	1.10	1.14	.47	.....	.22	.21
11	.....	[a] .65	.....	.24	.....	.17	26	.88	[a] 1.18	.36	.....	.27	.22
12	.....	.60	.....	.30	.....	.17	27	1.33	[a] 1.22	.39	.....	.31	.23
13	.....	.60	.....	.37	.....	.17	28	[a] 1.10	[a] 1.26	.42	.....	.36	.23
14	.....	[a] .63	.....	.44	.....	.24	29	.88	[a] 1.30	.44	.....	.40	.24
15	.....	[a] .66	.....	.50	.....	.22	30	.78	[a] 1.31	.50	.....	.45	.24
							31	.....	1.33	.....	.....	.50	.....

[a] Estimated.

Daily discharge, in second-feet, of H. T. Clark south ditch, near Eagle Butte, Alta., 1916–17—Continued.

Day.	May.	June.	July.	Day.	May.	June.	July.	Day.	May.	June.	July.
1917.											
1		a0.43	a0.24	11		0.68	0.14	21		a0.29	
2		a.41	a.27	12		a.55	.09	22		a.27	
3		a.39	a.30	13		.42	.05	23		a.25	
4		.37	.33	14		a.36	a.04	24		a.24	
5		.37	a.29	15		.29	a.03	25	0.61	.23	
6		.33	a.25	16		a.29	a.02	26	a.58	a.20	
7		.39	a.21	17		a.29	a.01	27	a.52	.16	
8		.45	a.17	18		a.30		28	.48	a.16	
9		.36	a.13	19		a.30		29	a.47	.16	
10		a.52	.10	20		.30		30	a.46	a.18	
								31	.45		

a Estimated.

NOTE.—Head gates opened May 25, 1917. Source of supply went dry July 17.

Monthly discharge of H. T. Clark south ditch near Eagle Butte, Alta., 1916–17.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1916.				
April 20–30	1.36	0.78	1.13	25
May	1.33	.51	.93	57
June 1–7, 16–30	1.87	.36	.82	36
July 1–20	.99	.22	.50	20
August 24–31	.50	.17	.34	5
September	.70	.17	.29	17
The period				160
1917.				
May 25–31	.61	.45	.511	7.1
June	.68	.16	.331	19.7
July 1–17	.33	.01	.157	5.3
The period				32.1

ENGLISH DITCH NEAR THELMA, ALTA.

LOCATION.—In SW. ¼ sec. 12, T. 7, R. 3 W. fourth meridian, 360 feet above two-way gate where first lateral is taken out of main ditch.

RECORDS AVAILABLE.—Irrigation seasons of 1916 and 1917.

GAGE.—Vertical staff; read by James English.

CHANNEL AND CONTROL.—Banks composed of loam and bed of gravel. Control shifts.

DISCHARGE MEASUREMENTS.—Made with current meter or weir near gage.

ACCURACY.—As channel has been cut down to gravel, rating curve should now be constant. Sufficient data were not obtained for curve for 1917; adaptation of curve for 1916 was used. Records only fair.

Discharge measurements of English ditch near Thelma, Alta., 1916–17.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1916.		*Feet.*	*Sec.-ft.*	1916.		*Feet.*	*Sec.-ft.*
May 8	H. W. Rowley	0.85	2.30	Nov. 6	H. W. Rowley	Dry.	0
20	do	.74	1.80				
June 17	do	Dry.	0	1917.			
July 12	do	do	0	May 24	J. C. Milligan		0
Aug. 2	do	do	0	June 21	do	.75	1.99
22	do	do	0	July 25	do		0
Sept. 19	do	do	0				

Daily discharge, in second-feet, of English ditch near Thelma, Alta., 1916–17.

Day.	May.	June.	Day.	May.	June.	Day.	May.	June.
1916.			1916.			1916.		
1	.....	.....	11	2.4	.....	21	1.88	2.1
2	.....	.....	12	2.2	.....	22	2.00	2.6
3	4.1	3.2	13	2.1	.....	23	3.00	2.6
4	2.7	3.2	14	2.20	.....	24	2.80	2.6
5	2.8	3.6	15	2.10	.....	25	.....	2.6
6	2.5	4.1	16	2.20	.....	26	.....	2.6
7	2.5	3.6	17	2.00	.....	27	.....	2.6
8	2.3	3.3	18	1.88	.....	28	.....	2.6
9	2.5	2.8	19	1.80	2.8	29	.....	2.8
10	2.5	2.8	20	1.80	2.8	30	.....	.....

Day.	May.	June.	July.	Day.	May.	June.	July.	Day.	May.	June.	July.
1917.				1917.				1917.			
1	.....	2.50	0.92	11	.....	4.00	.....	21	.....	2.00	.....
2	.....	2.40	.77	12	.....	3.60	.....	22	.....	1.87	.....
3	.....	2.30	.77	13	.....	3.20	.....	23	.....	1.79	.....
4	.....	2.20	.63	14	.....	2.80	.....	24	.....	1.59	.....
5	.....	2.30	.50	15	.....	2.20	.....	25	3.00	1.59	.....
6	.....	2.50	.24	16	.....	2.10	.....	26	3.20	1.59	.....
7	.....	2.40	.24	17	.....	2.00	.....	27	3.20	1.63	.....
8	.....	2.40	*a*.12	18	.....	1.79	.....	28	2.80	1.08	.....
9	.....	2.70	*a*.12	19	.....	1.79	.....	29	2.80	1.08	.....
10	.....	2.80	.....	20	.....	1.59	.....	30	2.70	1.24	.....
								31	2.60	.....	.....

a Estimated.

NOTE.—1916: Head gates open May 3–24, June 3–10, and June 19–29.
1917: Water diverted from May 24 to July 10, when source of supply went dry.

Monthly discharge of English ditch near Thelma, Alta., 1916–17.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1916.				
May 3–24	4.1	1.80	2.4	105
June 3–10, 19–29	4.1	2.10	2.9	109
The period	.....	.....	.....	214
1917.				
May 25–31	3.20	2.60	2.90	40
June	4.00	1.08	2.20	131
July 1–10	.92	0	.43	9
The period	.....	.....	.....	180

RESER DITCH NEAR CHINOOK, MONT.

LOCATION.—In sec. 12, T. 34 N., R. 18 E., 1 mile below head gates of ditch on Lodge Creek, 10 miles northwest of Chinook, Blaine County, Mont.

RECORDS AVAILABLE.—April 9 to August 9, 1905.

GAGE.—Vertical staff nailed to a post driven into the bottom of the canal, about a mile below the head gates.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—The ditch is built in a mud soil. The control is the bed of the ditch for some distance below the gage and is affected by growth of grass and weeds.

EXTREMES OF DISCHARGE.—Maximum discharge recorded, 8 second-feet July 14, 1905.

REGULATION.—Flow of canal is controlled by head gates.

ACCURACY.—Stage-discharge relation not permanent. Station visited by engineers five times in 1905, but only two discharge measurements obtained. Discharge estimated April 9 to June 15. Sufficient data not available to compute daily discharge. The results at this station are poor on account of the fragmentary character of the records. All available data are published, however, as they give some idea of the flow of this canal.

Discharge measurements of Reser ditch near Chinook, Mont., 1905–6.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1905.		*Feet.*	*Sec.-ft.*	1906.		*Feet.*	*Sec-ft.*
July 10	C. T. Prall	2.50	5.9	Apr. 28	W. B. Freeman	2.08	1.6
Aug. 2	W. B. Freeman	2.53	6.4	June 6	Freeman and Hartman	3.02	8.5

Monthly discharge of Reser ditch near Chinook, Mont., 1905.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
April 9–30	.....	.....	3.0	131
May	.....	.....	3.0	184
June 1–15	.....	.....	3.0	90
July	8	0	1.5	92
August	7	0	1.9	114
The period	8	0	.....	611

NOTE.—Estimates based on four discharge measurements and gage heights as follows, in feet: July 10 2.5; July 12–16, 2.5, 2.4, 2.7, 2.4, 2.3; July 31, 2.5; Aug. 1–5, 2.6 each day; Aug. 7–9, 2.5 each day. The gage was read by Mr. Reser, and statements by him were probably used in making the orignal estimates. The estimates are liable to a large percentage of error, but give some idea of the water diverted by the ditch.

The following gage heights were reported in 1906, in feet: Apr. 28, 2.08; May 27 to June 6, 3.00, 3.00, 3.25, 3.00, 3.00, 2.07, 2.05, 2.08, 2.07, 2.03, 3.00. The dam was washed out by the flood in June, 1906, and the ditch was closed for the remainder of the season.

WEST FORK DITCH NEAR CHINOOK, MONT.

LOCATION.—In sec. 10, T. 33 N., R. 19 E., 200 feet below the head gates on Lodge Creek, north of Chinook, Blaine County, Mont.

RECORDS AVAILABLE.—June 1, 1905, to July 25, 1906.

GAGE.—Vertical staff nailed to post in bed of ditch 200 feet below head gates.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Control consists of bed of canal below gage. Shifts in control are caused by the growth of vegetal matter on the bottom and sides of the canal.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 4.3 feet, May 31, 1906. A discharge measurement on May 29, 1906, at gage height 3.66 showed a flow of 20 second-feet.

REGULATION.—Flow of canal is controlled by head gates.

ACCURACY.—Stage-discharge relation not permanent. A few scattering gage heights only are available, and the daily discharge is estimated from these and the discharge measurements. Records, therefore, poor. All available data are published, however, as they give some idea of the flow of the canal.

Discharge measurements of West Fork ditch near Chinook, Mont., 1905–6.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1905.		*Feet.*	*Sec.-ft.*	1906.		*Feet.*	*Sec.-ft.*
June 16	Prall and Stockman	2.80	5.9	May 26	W. B. Freeman	.....	0
July 11	Prall and Morse	3.43	12.6	29	do	3.66	20.0
18	W. B. Freeman	1.70	.1	June 26	W. S. Hartman	2.16	1.62
Aug. 2	do	3.55	12.0	July 19	Morse and Hartman	2.65	5.38
10	do	3.50	13.0	25	W. S. Hartman	2.23	1.99
15	H. M. Morse	2.90	6.6	Aug. 11	do	.....	0

NOTE.—1905: July 18, discharge estimated.

Daily discharge, in second-feet, of West Fork ditch near Chinook, Mont., 1905–6.

Day.	June.	July.	Aug.	Day.	June.	July.	Aug.	Day.	June.	July.	Aug.
1905.				1905.				1905.			
1	8.5	.....	12	11	7.0	12	13	21	.....	.....	.....
2	8.5	.....	12.7	12	7.0	13	12	22	.....	.....	.....
3	8.5	.....	12	13	6.0	13	10	23	.....	.....	.....
4	8.0	.....	12	14	6.0	11	8.6	24	.....	.....	.....
5	8.0	.....	12	15	6.0	9	6	25	.....	.....	.....
6	8.0	.....	12	16	5.9	7	5	26	.....	.....	.....
7	7.5	.....	13	17	4.3	.....	4	27	.....	.....	.....
8	7.5	.....	13	18	3.0	.1	.....	28	.....	.....	.....
9	7.5	.....	13	19	2.0	.....	.....	29	.....	.....	.....
10	7.0	13	13	20	1.0	.....	.....	30	.....	.....	.....
								31	.....	12	.....

Day.	May.	June.	July.	Day.	May.	June.	July.	Day.	May.	June.	July.
1906.				1906.				1906.			
1	.....	24	.....	11	.....	.....	10	21	.....	.....	.....
2	.....	20	.....	12	.....	22	9	22	.....	7	.....
3	.....	.....	.....	13	.....	19	9	23	.....	.....	.....
4	.....	14	.....	14	.....	17	.....	24	.....	.....	.....
5	.....	26	.....	15	.....	16	.....	25	.....	.....	2
6	.....	22	.....	16	.....	.....	.....	26	.....	2	.....
7	.....	26	.....	17	.....	.....	.....	27	.....	.....	.....
8	.....	.....	.....	18	.....	.....	.....	28	.....	.....	.....
9	.....	.....	.....	19	.....	.....	8	29	14	.....	.....
10	.....	.....	11	20	.....	.....	7	30	.....	.....	.....
								31	34	.....	.....

NOTE.—June 1–15, July 10, 12–17, Aug. 1, 3–9, 11–14, and 16–17, 1905, discharge estimated. Canal dry June 21 to July 9, July 19–30, and Aug. 18–31, 1905. No flow in 1906 prior to May 28. There may have been some discharge in 1906 on days for which no gage readings are available, but the original computations do not indicate this.

Gage readings were reported as follows, in feet:

1905: June 16, 2.8; June 21, 0; July 9, 0; July 11, 3.43; July 18, 1.7; July 29, 0; Aug. 2, 3.35; Aug. 10, 3.5; Aug. 15, 2.9; Aug. 23, 0.

1906: May 29, 3.3; May 31, 4.3; June 1, 3.9; June 2, 3.7; June 4, 3.3; June 5, 3.95; June 6, 3.8; June 7, 4.0; June 8 (head gates closed); June 12, 3.8 (head gates opened); June 13, 3.6; June 14, 3.5; June 15, 3.4; June 22, 2.8; June 26, 2.15; July 10, 3.1 (head gates opened); July 11, 3.05; July 12, 3.0; July 13, 3.0; July 19, 2.9; July 20, 2.8; July 25, 2.25.

Monthly discharge of West Fork ditch near Chinook, Mont., 1905.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1905.				
June	8.5	0	4.2	250
July	13.0	0	2.9	179
August	13.0	0	5.9	364
The period	.....	.....	.....	793
1906.				
May (2 days)	.....	.....	24.0	95
June (12 days)	26	2	17.9	426
July (7 days)	11	2	8.0	111
The period	.....	.....	.....	632

NOTE.—See statement under accuracy in station description and footnote to daily discharge table. There may have been some flow in 1906 on days when the gage was not read, but the records do not cover this point. The above estimates for 1906 are for days on which gage readings were recorded.

LINDNER DITCH NEAR BATTLE CREEK, SASK.

LOCATION.—In NW. ¼ sec. 10, T. 6, R. 29 W. third meridian, about 1,000 feet from intake of ditch on Battle Creek.

RECORDS AVAILABLE.—Discharge measurements, 1910; irrigation seasons, 1911 to 1917.

GAGE.—Vertical staff; read by J. B. Lindner.

DISCHARGE MEASUREMENTS.—Made with a 42-inch rectangular weir set permanently in ditch.

CHANNEL AND CONTROL.—Bed of ditch gravel. Permanent 42-inch weir serves as artificial control.

ACCURACY.—Stage-discharge relation permanent. Discharge computed with weir formula. Records good.

Discharge measurements of Lindner ditch near Battle Creek, Sask., 1910, 1911, 1915, 1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1910.		*Feet.*	*Sec.-ft.*	1911.		*Feet.*	*Sec.-ft.*
June 11	H. R. Carscallen	.....	5.76	Aug. 2	M. H. French	2.9	[a] 0.056
July 4	.....do	.....	5.22	2	.....do	2.9	[a] 0.060
26	.....do	3.385	[a] 3.26	4	.....do	.....	0
27	.....do	3.01	[a] .36				
Aug. 12	.....do	2.95	[a] .07	1915.			
12	.....do	3.03	[a] .06	May 8	H. W. Rowley	1.71	6.30
Sept. 5	.....do	3.05	[a] .09	July 10	.....do	Dry.	.0
29	R. G. Swan	3.04	[a] .04				
Oct. 26	.....do	3.04	[a] .04	1917.			
				July 14	H. W. Rowley	1.84	9.6
				23	.....do	Dry.	0

[a] Weir measurement.

Daily discharge, in second-feet, of Lindner ditch near Battle Creek, Sask., 1910–1917.

Day.	July.	Aug.	Sept.	Oct.	Day.	July.	Aug.	Sept.	Oct.
1910.					1910.				
1		0.07	0.08		16		0.0		
2		.07	.08		17		.0		
3		.07	.08		18		.0		
4		.07	.09		19		.07		
5		.07	.09		20		.07		
6		.07	.09		21		.07		
7		.07	.09	0.04	22		.07		
8		.07	.09	.04	23		.06		
9		.07		.04	24		.06		
10		.07		.04	25		.06		
11		.07		.04	26	3.26	.07		
12		.70		.04	27	.36	.07		
13		.07		.04	28	.36	.08		
14		.07			29	.36	.08		
15		.07			30	.07	.08		
					31	.07	.07		

Day.	May.	June.	July.	Aug.	Day.	May.	June.	July.	Aug.
1911.					1911.				
1		2.67	0.06	0.06	16	3.21	0.06	1.27	0.04
2		2.67	.06	.06	17	3.21	.06	1.27	.04
3		2.67	.06	.06	18	.06	.06	1.27	.04
4		2.67	.06	.06	19		.06	1.27	.04
5		2.67	.06	.06	20		.06	1.27	.04
6		2.67	.06	.06	21		.06	1.27	
7		2.67	.06	.06	22		.06	.06	
8		2.67	.06	.06	23		.06	.06	
9	2.17	2.67	.06	.00	24		.06	.06	
10	2.17	2.67	.06	.04	25		.06	.06	
11	2.17	2.67	.06	.04	26		.06	.06	
12	2.17	.06	.06	.04	27		.06	.06	
13	2.17	.06	.06	.04	28		.06	.06	
14	2.17	.06	.06	.04	29		.06	.06	
15	3.21	.06	1.27	.04	30		.06	.06	
					31			.06	

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1912.					1912.				
1		1.71		8.30	16		7.68		
2		1.01		8.30	17		7.68		
3				8.30	18		7.68		
4			6.27	8.30	19		7.68		
5			6.27	8.30	20		7.68		
6			6.27	8.30	21				
7			6.27	8.30	22				
8			6.27	8.30	23			3.20	
9			2.66	8.30	24			3.20	
10			2.66	8.30	25			3.20	
11			2.66	8.30	26			3.20	
12			2.66		27			3.20	
13			1.01		28	8.30		8.30	
14					29	8.30		8.30	
15					30	1.71		8.30	
					31				

Day.	Apr.	May.	June.	July.	Aug.	Day.	Apr.	May.	June.	July.	Aug.
1913.						1913.					
1			3.00	4.00	1.88	16	1.18	4.0	0.67	4.00	
2			3.00	4.00	1.88	17	1.18	4.0	4.60	4.00	
3			3.00	4.00		18		4.0	10.20	4.00	
4			9.00	4.00		19		4.0	10.20	4.00	
5		3.3	9.00	4.00		20		4.0	4.00	4.00	
6		3.3	9.00	9.00		21		4.0	4.00	7.80	
7		4.6	6.30	9.00		22		4.0	4.00	7.80	
8		5.3	3.40	9.00		23		4.6	4.00	7.80	
9		5.3	3.40	4.00		24		4.6	4.00	7.80	
10		5.3	3.40	4.00		25		4.6	4.00	7.80	
11		5.3	1.70	4.00		26		4.6	4.00	7.80	
12		4.0	.37	4.00		27		4.6	4.00	4.00	
13		4.0	.67	4.00		28		4.6	4.00	4.00	
14		4.0	.67	4.00		29		4.6	4.00	1.88	
15	3.4	4.0	.67	4.00		30		4.0	4.00	1.88	
						31		4.0		1.88	

Daily discharge, in second-feet, of Lindner ditch near Battle Creek, Sask., 1910–1917—Continued.

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1914.					1914.				
1		6.00	1.34		16				
2		6.00	1.53		17		3.90		
3		6.00	1.53		18		3.90		
4		6.00	1.53		19		3.90		
5		6.70	2.10	2.50	20		3.90		
6			2.20	2.50	21		3.90		
7			2.30	2.50	22		3.90		
8			2.30	2.50	23		3.90		
9			2.50	2.50	24		2.50		
10			2.50	2.30	25		2.50		
11				2.10	26		2.50		
12				2.00	27		2.30		
13				2.00	28		1.71		
14				2.00	29		1.53		
15				2.00	30	6.00	1.44		
					31		1.26		

Day.	Apr.	June.	July.	Day.	Apr.	June.	July.	Day.	Apr.	June.	July.
1915.				1915.				1915.			
1			6.00	11				21	4.90		
2			6.00	12	2.60			22	4.90		
3			6.00	13	6.80			23	4.90		
4			4.70	14	6.80			24			
5			4.70	15	6.80			25			
6			4.70	16	6.80			26			
7			4.70	17	6.80			27			
8			4.70	18	6.80			28			
9				19	6.80			29		6.00	
10				20	4.90			30		6.00	
								31			

Day.	Apr.	May.	July.	Day.	Apr.	May.	July.	Day.	Apr.	May.	July.
1916.				1916.				1916.			
1				11				21	4.80		
2				12				22	4.80		
3				13				23	4.80		
4				14			2.1	24	4.80		
5				15			3.1	25	.03		
6				16			3.1	26			
7		9.7		17	4.80		3.1	27			
8		9.7		18	4.80		3.1	28			
9		9.7		19	4.80			29			
10		9.7		20	4.80			30			
								31			

Day.	May.	June.	July.	Day.	May.	June.	July.	Day.	May.	June.	July.
1917.				1917.				1917.			
1				11		4.9	10.0	21		6.3	
2				12		4.9	10.0	22		6.3	
3				13			10.0	23		6.3	
4				14	11.0		9.6	24		6.3	
5				15	11.0		.8	25			
6				16	13.0		.8	26			
7				17	13.0			27			
8				18				28			
9		4.9		19		6.3	6.3	29			
10		4.9	10.0	20		6.3	4.9	30			
								31			

Monthly discharge of Lindner ditch near Battle Creek, Sask., 1911–1917.

Month.	Discharge in second-feet.			Total discharge in acre-feet.
	Maximum.	Minimum.	Mean.	
1911.				
May 9–18	3.21	0.06	2.27	45
June	2.67	.06	1.02	60
July	1.27	.06	.33	20
August 1–20	.06	.04	.05	2
The period				127
1912.				
April 28–30	8.30	1.71	6.10	36
May	7.68	1.01	5.87	82
June	8.30	1.01	4.66	166
July 1–11	8.30	8.30	8.30	181
The period				465
1913.				
April 15–17	11.40	1.18	1.92	11
May 5–31	5.30	3.30	4.32	231
June	10.20	.37	4.21	250
July	9.00	1.88	5.01	308
August 1–2	1.88	1.88	1.88	7
The period				807
1914.				
April 30	6.00	6.00	6.00	12
May 1–5, 17–31	6.70	1.26	3.70	146
June 1–10	2.50	1.34	1.98	39
July 5–15	2.50	2.00	2.30	49
The period				246
1915.				
April 12–23	6.80	2.60	5.80	139
June 29–30	6.00	6.00	6.00	24
July 1–8	6.00	4.70	5.20	83
The period				246
1916.				
April 17–25	4.8	.03	4.3	77
May 6–9	9.7	9.70	9.7	77
July 14–18	3.1	2.10	2.9	29
The period				183
1917.				
May 14–17	13.0	11.0	12.0	95
June 9–12, 19–24	6.3	4.9	5.7	113
July 10–16, 19–20	10.0	.8	6.9	123
The period				331

Water used through Lindner ditch near Battle Creek, Sask., 1910–1917.

Year.	Acre-feet.	Time used.		Maximum discharge.
		From—	Till—	
				Sec.-ft.
1910				5.76
1911	127	May 9 June 1	May 18. Aug. 20.	3.21
1912	465	Apr. 28	[a]July 11	8.30
1913	807	Apr. 15 May 5	Apr. 17. Aug. 2.	11.40
1914	246	May 1	[a]July 15	6.70
1915	246	Apr. 12	[a] July 8	6.80
1916	183	Apr. 17	[a]July 18	9.70
1917	331	May 14	[a]July 20	13.00
Yearly average	344			

[a] Water used intermittently.

MARSHALL & GAFF DITCH NEAR TENMILE POLICE DETACHMENT, SASK.

LOCATION.—In NE. ¼ sec. 33, T. 5, R. 29 W. third meridian, about 250 feet below intake of ditch, on Battle Creek.

RECORDS AVAILABLE.—Discharge measurements only for 1911; incomplete records for 1912; discharge measurements only for 1913; no records for 1914–15; presumably no water used in 1916; discharge measurements only for 1917.

GAGE.—Vertical staff; zero maintained at 95.02 feet. Observer, Mrs. L. A. Marshall.

DISCHARGE MEASUREMENTS.—Made with weir, near gage.

CHANNEL AND CONTROL.—Bed of ditch, clay. Control consists of a log imbedded in ditch 50 feet below gage; stage-discharge relation probably affected by grass in ditch.

ACCURACY.—Gage heights very incomplete; records poor.

No water used by Mrs. Marshall. Seepage losses from intake to station on J. A. Gaff ditch about 2 miles downstream amounts to almost 50 per cent of flow.

Discharge measurements of Marshall & Gaff ditch near Tenmile Police Detachment, Sask., 1911 and 1913.

Date.	Made by—	Gage height.	Discharge.
1911.			
Aug. 2	M. H. French	*Feet.*	*Sec.-ft.*
25	....do	.....	0.309
Sept. 20	....do	.....	0
1913.		0.35	2.210
June 4	H. D. St. A. Smith	.43	2.54
23	....do	1.00	16.24
July 3	H. O. Brown	.36	1.90

J. A. GAFF DITCH NEAR BATTLE CREEK, SASK.

LOCATION.—In SW. ¼ sec. 25, T. 5, R. 29 W. third meridian, about a mile below intake of ditch, on Battle Creek.

RECORDS AVAILABLE.—Discharge measurements only for 1911; presumably no water used in 1916; complete records 1912–1915, and for 1917.

GAGE.—Vertical staff; read by W. D. Gaff.

DISCHARGE MEASUREMENTS.—Made with current meter or weir.

CHANNEL AND CONTROL.—Bed of ditch gravelly. Control consists of a log imbedded in ditch 20 feet below gage.

DIVERSIONS.—Mrs. L. A. Marshall diverts water from this ditch above this station. (See records for Marshall & Gaff ditch.)

ACCURACY.—Stage-discharge relation permanent.

Discharge measurements of J. A. Gaff ditch near Battle Creek, Sask., 1911–1915 and 1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1911.		*Feet.*	*Sec.-ft.*	1914.		*Feet.*	*Sec.-ft.*
May 19	M. H. French	.....	13.21	May 27	H. W. Rowley	1.83	13.5
Aug. 2	.....do	.....	0	June 22	.....do	1.73	10.6
25	.....do	.....	0	Oct. 23	.....do	.83	3.2
Sept. 25	.....do	0.63	[a]1.60	23	.....do	.83	3.1
1912.				1915.			
June 26	O. H. Hoover	1.52	10.78	May 7	H. W. Rowley	1.54	9.1
July 4	G. R. Elliott	.25	[b] .26	June 25	.....do	Dry.	0
6	.....do	[b] .17	.....	Aug. 6	.....do	...do ..	0
8	.....do	1.67	[b]11.77	Oct. 2	.....do	...do ..	0
31	.....do	1.00	4.19	20	.....do	2.03	6.5
1913.				1917.			
May 31	H. D. St. A. Smith	1.50	12.20	June 12	H. W. Rowley	Dry.	0
June 23	.....do	.50	1.53	July 21	.....do	2.07	7.0
July 3	H. O. Brown	.38	[b] .72	Aug. 15	.....do	1.64	3.3

[a] Melting snow only

[b] Weir measurement.

Daily discharge, in second-feet, of J. A. Gaff ditch near Battle Creek, Sask., 1912–1915 and 1917.

Day.	June.	July.	Day.	June.	July.	Day.	June.	July.
1912.			1912.			1912.		
1		8.0	11	15.7	10.7	21	15.2	
2		9.6	12	14.6	9.1	22	14.6	
3		10.7	13	15.2	11.2	23	14.6	
4		1.02	14	18.6		24	14.6	
5		.48	15	21.4		25	12.3	
6		.12	16	15.5		26	12.3	
7	12.3		17	17.5		27	11.2	
8	16.9		18	11.2		28	12.3	
9	15.7	10.1	19	16.9		29	10.1	
10	16.3	9.6	20	16.3		30	8.0	
						31		

Day.	May.	June.	Day.	May.	June.	Day.	May.	June.
1913.			1913.			1913.		
1		14.6	11		5.9	21		
2		17.0	12		12.2	22		
3		15.2	13		12.2	23		
4		12.2	14		10.0	24		
5		11.6	15		10.0	25		
6		11.6	16		10.0	26		
7		12.2	17			27		
8		13.4	18			28		
9		8.8	19			29		
10		7.8	20			30		
						31	12.2	

Day.	May.	June.	July.	Day.	May.	June.	July.	Day.	May.	June.	July.
1914.				1914.				1914.			
1		12.20	8.00	11		13.50		21	16.70	13.50	
2		11.00	8.00	12		12.80		22	14.80	12.20	
3		12.20	6.70	13		14.80		23	14.10	10.00	
4		11.00		14	7.10	14.80		24	12.20	9.00	
5		14.10		15	9.00	14.80		25	9.00	9.00	
6		13.50		16	9.00	14.80		26	8.00	16.10	
7		13.50		17	10.30	13.50		27	13.50	16.70	
8		13.50		18	13.80	12.20		28	12.20	13.50	
9		13.50		19	15.40	13.50		29	11.00	11.00	
10		14.80		20	14.80	14.80		30	9.00	10.00	
								31	9.00		

Day.	May.	June.	Day.	May.	June.	Day.	May.	June.
1915.			1915.			1915.		
1		13.50	11	9.0		21		
2		14.80	12	9.0		22	10.0	
3			13	8.0		23	10.0	
4	10.0		14	16.1		24	10.0	
5	9.0		15			25	10.0	
6	9.0		16			26	14.8	
7	10.0		17			27	14.8	
8	10.0		18			28	14.8	
9	9.0		19			29	14.8	
10	8.0		20			30	13.5	
						31	13.5	

Day.	June.	July.	Aug.	Day.	June.	July.	Aug.	Day.	June.	July.	Aug.
1917.				1917.				1917.			
1		4.90	9.7	11			9.0	21	5.3	7.10	
2		4.80	9.7	12			8.0	22	5.3	6.30	
3			9.7	13			6.5	23	4.5	6.40	
4			9.7	14			5.0	24	5.3	6.50	
5			9.9	15			3.3	25	5.3	7.40	
6			10.0	16	1.0			26	5.2	8.30	
7			10.6	17	2.0			27	5.2	9.20	
8			11.6	18	2.2	0.90		28	4.6	9.40	
9			12.6	19	2.0	3.90		29	3.9	9.20	
10			10.0	20	2.8	6.30		30	4.6	9.40	
								31		9.60	

Monthly discharge of J. A. Gaff ditch near Battle Creek, Sask., 1912–1915 and 1917.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1912.				
June 7–30	21.4	0.00	14.6	695
July 1–27	11.2	0.00	7.33	160
The period				855
1913.				
May 31	12.2	12.2	12.2	24
June 1–16	17.0	5.9	11.5	365
The period				389
1914.				
May 14–31	16.70	7.10	11.60	414
June	16.70	9.00	13.00	774
July 1–3	8.00	6.70	7.40	44
The period				1,232
1915.				
May 4–14, 22–31	16.10	8.00	11.10	462
June 1–2	14.80	13.50	14.00	56
The period				518
1917.				
June 16–30	5.3	1.00	3.9	116
July	9.6	.90	6.8	216
August 1–15	12.6	3.30	9.0	268
The period				600

Water used through J. A. Gaff ditch near Battle Creek, Sask., 1912–1917.

[Source of supply, Battle Creek.]

Year.	Acre-feet.	Time used.		Maximum discharge.
		From—	Till—	
				Sec.-ft.
1912	855	June 7	July 13	21.4
1913	389	May 31	June 16	17.0
1914	1,232	May 14	July 3	16.7
1915	518	May 4	June 2	16.1
1916 [a]				
1917	600	June 16	[b] July 16	12.6
Yearly average	719			

[a] No water used. [b] Water used intermittently.

HENRY DITCH NEAR BATTLE CREEK, SASK.

LOCATION.—In the NW. ¼ sec. 28, T. 5, R. 28 W. third meridian, about a mile below intake of ditch, on Battle Creek.

RECORDS AVAILABLE.—Complete records for 1915; no water used in 1916 and 1917, as dam in Battle Creek was destroyed by flood.

GAGE.—Vertical staff; read by F. W. Henry.

DISCHARGE MEASUREMENTS.—Made with 5-foot weir permanently placed in ditch below gage.

CHANNEL AND CONTROL.—Bed of ditch, clay. Control, 5-foot weir.

ACCURACY.—Discharge measured over weir.

Discharge measurement of Henry ditch near Battle Creek, Sask., 1915.

[Made by H. W. Rowley.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
May 7	0.61	3.8

NOTE.—Station was visited June 23, Aug. 6, Sept. 4, Sept. 22, and Oct. 20 by H. W. Rowley, who reported channel dry—no flow.

Daily discharge, in second-feet, of Henry ditch near Battle Creek, Sask., 1915.

Day.	May.	Day.	May.	May.	May.
	Sec.-ft.		*Sec.-ft.*		*Sec.-ft.*
1		6		11	4.00
2		7	3.80	12	1.70
3		8	4.40	13	1.73
4		9	4.20	14	1.94
5		10	4.10	15	

Monthly discharge of Henry ditch near Battle Creek, Sask., 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
May 7–14	4.4	1.7	3.2	51

WILSON DITCH NEAR BATTLE CREEK, SASK.

LOCATION.—In the NE. ¼ sec. 34, T. 5, R. 28 W. third meridian.

RECORDS AVAILABLE.—Discharge measurements only in 1914; no water used during 1915–1917.

GAGE.—Vertical staff; read by W. S. Wilson.

DISCHARGE MEASUREMENTS.—Made with a current meter or weir.

CHANNEL AND CONTROL.—Bed of ditch, clay.

Discharge measurements of Wilson ditch near Battle Creek, Sask., 1914.

[Made by H. W. Rowley.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
June 20		0.53
May 27	1.13	2.20

GILCHRIST DITCH NEAR CONSUL, SASK.

LOCATION.—In the SW. ¼ sec. 11, T. 5, R. 27 W. third meridian, at intake of ditch on Battle Creek.

RECORDS AVAILABLE.—Complete records for 1914; no records for 1915; ditch dry in 1916–17.

GAGE.—Vertical staff; read by W. F. Gilchrist.

DISCHARGE MEASUREMENTS.—Made with weir or current meter.

CHANNEL AND CONTROL.—Bed of ditch clay.

ACCURACY.—No rating curve developed since 1914.

No water could be diverted during 1916 or 1917 because of the diversion of Battle Creek through another channel immediately above the dam.

Discharge measurements of Gilchrist ditch near Consul, Sask., 1914.

[Made by H. W. Rowley.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
May 26	0.46	0.85
June 20	.65	2.11
Oct. 1	.54	1.23

Daily discharge, in second-feet, of Gilchrist ditch near Consul, Sask., 1914.

Day.	May.	June.	Sept.	Oct.	Day.	May.	June.	Sept.	Oct.
1				1.25	16				
2				1.25	17		3.70		
3				1.25	18		5.00		
4				1.67	19		4.80		
5				2.40	20		1.90	3.20	
6				3.20	21	2.40		3.20	
7					22	2.40		2.80	
8		2.40			23	4.20		2.40	
9		2.40			24			2.80	
10		1.52			25	2.60			
11		1.52			26	.59			
12		3.70			27	.49		3.20	
13		3.70			28			3.20	
14					29			3.20	
15					30			3.20	
					31				

Monthly discharge of Gilchrist ditch near Consul, Sask., 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
May 21–27	4.20	0.49	2.10	25
June	5.00	1.52	3.10	61
September 20–24, 27–30	3.20	2.40	3.00	54
October 1–6	3.20	1.25	1.84	22
The period				162

RICHARDSON DITCH NEAR CONSUL, SASK.

LOCATION.—In the SE. ¼ sec. 2, T. 5, R. 27 W. third meridian, about a mile below intake on Battle Creek.

RECORDS AVAILABLE.—Discharge measurements only for 1911; ditch dry in 1912; no records for 1913; discharge measurements only for 1914; gage heights only for 1915; ditch dry during 1916.

GAGE.—Vertical staff; zero maintained at 97.03 feet. Observer, L. E. Richardson.

DISCHARGE MEASUREMENTS.—Made with a current meter or weir.

CHANNEL AND CONTROL.—Bed of ditch clay. Control affected by weeds.

No rating curve developed. Probably no water diverted during 1917.

Discharge measurements of Richardson ditch near Consul, Sask., 1911–1914.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
1911			
June 3	M. H. French	.....	1.347
July 11	.....do	.....	[a] .545
Aug. 4	.....do	.....	[a] .300
1914			
June 20	H. W. Rowley	0.46	1.98

[a] Weir measurement.

JAS. McKINNON DITCH NEAR CONSUL, SASK.

LOCATION.—In NW. ¼ sec. 20, T. 4, R. 26 W. third meridian, about a mile below intake of ditch on Battle Creek.

RECORDS AVAILABLE.—One discharge measurement for 1911; no water diverted in 1912; no records for 1913–1915; no water diverted in 1916.

GAGE.—Vertical staff; read by J. McKinnon.

DISCHARGE MEASUREMENTS.—Made with current meter.

CHANNEL AND CONTROL.—Bed of ditch, clay; control may be affected by diversion into a lateral a short distance below gage.

ACCURACY.—Records incomplete and poor.

No reports of gage height for 1917 received after July 29. Probably little if any water was used after that date.

The following discharge measurement was made by M. H. French August 28, 1911: Discharge, 5.35 second-feet.

STIRLING & NASH DITCH NEAR CONSUL, SASK.

LOCATION.—In the SE. ¼ sec. 22, T. 3, R. 27 W. third meridian, at R. I. Stirling's ranch, about 2 miles below the intake of ditch, on Battle Creek.

RECORDS AVAILABLE.—Discharge measurements in 1911 and 1913. Complete records 1914–1917.

GAGE.—Vertical staff; read by Robert Stirling.

DISCHARGE MEASUREMENTS.—Made with current meter.

CHANNEL AND CONTROL.—Bed of ditch, clay; permanent. An artificial control, made of sheet piling, constructed across the ditch 30 feet below the gage.

ACCURACY.—Stage-discharge relation permanent. Gage read irregularly. Discharge computed by applying daily gage heights to rating table. Records fair.

Discharge measurements of Stirling & Nash ditch near Consul, Sask., 1911–1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1911.		*Feet.*	*Sec.-ft.*	1915.		*Feet.*	*Sec.-ft.*
May 11	M. H. French	.....	6.17	Sept. 24	H. W. Rowley	Dry.	0
June 5	.....do	.....	7.67	Oct. 21	.....do	Dry.	0
July 10	.....do	1.35	10.24				
Aug. 5	.....do	.50	0	1916.			
				Apr. 29	H. W. Rowley	Dry.	0
1913.				May 13	.....do	Dry.	0
June 17	H. D. St. A. Smith	1.32	3.97	June 30	.....do	1.81	5.80
				July 21	.....do	Dry.	0
1914.				Aug. 14	.....do	Dry.	0
May 1	H. W. Rowley	1.39	6.80	Sept. 1	.....do	Dry.	0
26	.....do	1.51	7.50	28	V. A. Newhall and Rowley	Dry.	0
June 19	.....do	1.49	6.30	Nov. 14	H. W. Rowley	Dry.	0
1915.				1917.			
Apr. 23	H. W. Rowley	1.25	3.50	June 29	H. W. Rowley	2.23	9.9
May 21	.....do	1.00	0	July 17	.....do	.....	[a] 8.7
June 23	.....do	1.76	4.00	18	.....do	1.67	3.3
Aug. 14	.....do	Dry.	0				
Sept. 4	.....do	Dry.	0				

[a] Miscellaneous gaging for seepage and evaporation.

Daily discharge, in second-feet, of Stirling & Nash ditch near Consul, Sask., 1914–1917.

Day.	Apr.	May.	June.	Day.	Apr.	May.	June.	Day.	Apr.	May.	June.
1914.				1914.				1915.			
1	.....	6.10	7.10	21	4.80	10.80	3.70	11	.....	8.10	3.30
2	.....	6.10	7.10	22	4.80	10.80	3.00	12	.....	8.30	4.60
3	.....	7.80	7.10	23	4.80	10.80	2.60	13	.....	8.30	4.70
4	.....	7.80	6.60	24	4.80	10.60	2.50	14	.....	9.30	4.70
5	.....	7.80	6.60	25	4.80	10.60	2.50	15	.....	4.40	4.20
6	.....	8.70	6.40	26	5.40	9.80	2.20	16	.....	.30	3.60
7	.....	9.20	6.40	27	5.10	8.10	1.66	17	.....	.82	3.00
8	.....	10.80	6.40	28	5.10	7.40	.85	18	0.40	.25	2.80
9	.....	11.40	6.40	29	5.40	7.40	.28	19	4.10	.00	4.10
10	.....	11.40	6.40	30	5.40	7.40	.05	20	6.40	.00	4.30
11	.....	11.40	5.80	31	.....	7.40	.....	21	6.40	.50	4.30
12	.....	11.40	5.80	1915.				22	6.40	.86	4.20
13	.....	11.40	5.30	1	.....	6.40	1.56	23	6.40	1.22	4.00
14	.....	11.40	5.30	2	.....	6.40	1.56	24	6.40	1.36	2.40
15	.....	11.40	5.30	3	.....	6.80	1.50	25	6.40	1.36	1.31
16	.....	11.40	5.30	4	.....	5.20	1.36	26	6.40	1.36	.72
17	.....	11.20	4.50	5	.....	4.40	1.36	27	6.40	1.36	.18
18	.....	11.20	4.50	6	.....	4.10	1.36	28	6.40	1.36	.10
19	2.80	11.20	4.00	7	.....	4.10	1.36	29	6.40	1.36	.06
20	4.80	11.20	3.70	8	.....	5.20	1.36	30	6.40	1.36	1.04
				9	.....	6.90	1.36	31	.....	1.36	.....
				10	.....	7.70	1.98				

Day.	June.	July.	Day.	June.	July.	Day.	June.	July.
1916.								
1	.....	1.50	21	.....	.....	11	3.50	6.80
2	.....	1.20	22	.....	.....	12	4.20	6.80
3	.....	2.20	23	.....	.....	13	4.70	6.80
4	.....	4.10	24	.....	.....	14	4.70	6.80
5	.....	4.80	25	.....	.....	15	1.20	2.10
6	.....	4.80	26	.....	.....	16	.19	.44
7	.....	4.80	27	4.2	.....	17	4.40	4.30
8	.....	4.80	28	6.1	.....	18	7.50	6.80
9	.....	4.80	29	5.8	.....	19	8.70	6.80
10	.....	4.70	30	5.2	.....	20	10.60	6.80
11	.....	4.60	31	.....	.....	21	9.50	5.60
12	.....	3.10	1917.			22	9.10	4.00
13	.....	1.50	1	.....	5.00	23	6.10	3.70
14	.....	.76	2	.....	5.00	24	2.10	3.50
15	.....	0	3	.....	5.00	25	1.14	3.10
16	.....	0	4	.....	5.70	26	.60	2.90
17	.....	2.60	5	.....	7.40	27	.14	2.50
18	.....	4.70	6	.....	9.50	28	2.50	1.98
19	.....	.....	7	.....	8.10	29	5.80	.....
20	.....	.....	8	.....	8.10	30	5.00	.....
			9	0	8.10	31	.....	.....
			10	1.60	7.20			

Monthly discharge of Stirling & Nash ditch near Consul, Sask., 1914–1917.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1914.				
April 19–30	5.40	2.80	4.80	115
May	11.40	6.10	9.70	598
June	7.10	.05	4.52	269
The period	.....	.....	.....	982
1915.				
April 18–30	6.40	.40	5.80	149
May	9.30	.00	3.60	222
June	4.70	.04	2.40	141
The period	.....	.....	.....	512
1916.				
June 27–30	6.10	4.2	5.30	42
July 1–18	4.80	0	3.10	111
The period	.....	.....	.....	153
1917.				
June 9–30	10.60	0	4.23	185
July 1–28	9.50	.44	5.39	299
The period	.....	.....	.....	484

Water used through Stirling & Nash ditch, near Consul, Sask., 1914–1917.

[Source of supply, Battle Creek.]

Year.	Acre-feet.	Time used.		Maximum discharge.
		From—	Till—	
				Sec.-ft.
1914	982	Apr. 19	June 30	11.4
1915	512	Apr. 18	...do.....	9.3
1916	153	June 27	July 18	6.1
1917	484	June 10	July 28	10.6
Yearly average	533	.....	.....	.....

a Water used intermittently.

COOK CANAL NEAR CHINOOK, MONT.

LOCATION.—In N. ½ sec. 30, T. 33 N., R. 20 E., half a mile below head gate on Battle Creek and 3 miles east of Chinook, in Blaine County.

RECORDS AVAILABLE.—April 10, 1905, to December 31, 1917.

GAGE.—Vertical staff on left bank 1,000 feet above point at which canal turns west and runs parallel with the road.

DISCHARGE MEASUREMENTS.—Made by wading where canal passes under the Great Northern Railway, half mile below gage.

CHANNEL AND CONTROL.—Channel of earth. No well-defined control. Weeds growing along the bottom cause backwater. Canal infested with beavers, whose dams are likely to cause backwater.

EXTREMES OF DISCHARGE.—Maximum discharge recorded for irrigation, 71 second-feet April 17, 1914.

ACCURACY.—Stage-discharge relation not permanent; affected by vegetal growth to varying amounts each season. A number of discharge measurements are necessary each year to define the rating curves. Gage read to half-tenths daily. Records fair.

Water is diverted from Battle Creek half a mile above gage, and is used to irrigate lands in Milk River valley on south side of river. Canal crosses Milk River in a flume. Water can be wasted into Milk River at this flume, which is about 2 miles below the gage. Little water is returned to the stream intentionally, but when too much water is turned in at the head gate the flume acts as throttle.

Discharge measurements of Cook canal near Chinook, Mont., 1905–1917.

Date.	Made by—	Gage height.	Discharge.
1905.		*Feet.*	*Sec.-ft.*
Apr. 10	L. R. Stockman	3.4	37.7
24	Stockman and Morse	3.28	35.5
May 17	H. M. Morse	3.18	26.7
June 3	do	3.02	20.6
17	Stockman and Prall	2.98	21.5
24	C. T. Prall	3.26	30.6
July 3	Babb and Prall	2.39	3.0
7	W. B. Freeman	2.22	2.3
15	C. T. Prall	2.80	13.4
Aug. 5	W. B. Freeman	2.93	17.0
11	H. M. Morse	2.45	6.0
1906.			
Apr. 6	W. B. Freeman	2.97	19.7
19	Freeman and Morse	2.73	18.9
23	do	2.21	6.00
May 5	W. B. Freeman	.....	.00
23	do	2.80	16.6
28	do	3.58	35.1
June 5	Freeman and Hartman	3.79	43.9
26	do	2.85	19.4
July 19	Morse and Hartman	3.15	25.7
24	W. S. Hartman	3.23	24.3
Aug. 11	do	2.86	8.38
25	do	2.91	9.18
Sept. 3	do	2.25	3.40
21	do	2.12	2.5
1907.			
Apr. 24	J. B. Pierson	2.40	0.0
May 10	do	2.63	1.0
25	do	.....	.0
June 4	do	.....	.0
July 6	do	2.38	3.3
29	do	3.05	8.2
Aug. 19	do	2.00	.0
1908.			
Apr. 6	Stewart and Huch	2.20	0.0
25	A. F. Huch	2.06	12.4
May 4	do	3.51	31.5
11	do	3.37	21.2
15	Stewart and Huch	3.28	18.5
26	A. F. Huch	2.19	3.7
June 3	do	2.29	5.0
13	do	2.04	1.5
23	do	2.38	4.1
July 7	do	1.24	2.5
16	do	2.00	.9
Aug. 4	do	1.30	2.9
1909.			
Apr. 21	W. A. Lamb	2.85	18
May 3	do	3.03	20
18	do	3.20	20
June 9	do	3.33	18
26	do	1.70	1.9
July 14	do	1.80	1.8
Aug. 1	do	1.20	.0
20	do	2.00	3.7
1910.			
Apr. 29	M. E. McChristie	3.11	21
May 6	do	2.60	13
16	do	2.45	9.7
20	do	2.57	15
25	do	2.54	9.7
June 4	do	1.95	3.5
1911.		*Feet.*	*Sec.-ft.*
Apr. 12	John C. Beebe	2.19	23
23	do	3.97	51
May 2	do	3.89	39
9	do	2.16	1.3
13	do	3.88	42
20	do	3.83	30
26	do	3.98	35
June 11	do	3.16	12.8
22	do	2.17	2.8
29	do	2.43	3.4
July 5	do	1.75	.0
1912.			
July 25	R. R. Randell	1.76	1.6
1913.			
May 2	J. B. Stewart	2.70	15.0
15	do	3.18	25
20	do	3.20	25
June 4	do	2.92	17.2
16	do	2.20	6.5
28	do	2.70	12.4
July 11	do	3.03	16.6
25	do	1.40	1.1
Aug. 5	do	1.50	.5
11	do	1.32	.3
1914.			
Apr. 29	B. E. Jones	3.21	37
May 4	do	3.11	35
9	do	2.90	26
16	do	3.45	37
25	do	2.64	14.1
27	do	2.22	9.0
June 2	do	1.66	3.2
8	do	1.78	3.9
19	do	2.32	8.9
22	do	1.61	2.5
30	do	1.78	1.6
July 7	W. Arthurs	1.95	2.1
1915.			
Apr. 13	B. E. Jones	2.22	9.6
26	do	3.02	30
May 3	do	3.31	32
10	do	3.20	23
19	do	3.25	19.7
June 3	do	2.59	11.8
16	do	2.36	9.0
29	do	2.65	10.4
July 5	do	2.48	9.3
22	do	2.22	6.1
26	do	1.66	2.4
Aug. 3	do	1.61	1.3
9	do	1.36	.1
1916.			
Apr. 14	A. H. Tuttle	.....	.0
May 3	do	2.37	15.5
14	do	3.30	28.1
28	do	1.44	3.1
June 16	do	3.15	21.3
16	do	3.15	21.5
July 19	do	1.90	7.3
1917.			
June 18	A. H. Tuttle	2.48	8.2
23	do	2.90	14.7
July 14	do	2.60	9.6

NOTE.—1906: Sept. 21, discharge estimated.
1908: Apr. 25, July 7, and Aug. 4, gage probably read 1.0 foot too low by engineer.
1913: Aug. 5 and 11, discharge estimated.
1915: Aug. 9, discharge estimated.

Daily discharge, in second-feet, of Cook canal near Chinook, Mont., 1905–1917.

Day.	Apr.	May.	June.	July.	Aug.	Day.	Apr.	May.	June.	July.	Aug.
1905.						1905.					
1	.....	50	0	0	19	16	.....	27	25	0	.....
2	.....	50	0	0	21	17	.....	29	21	0	.....
3	.....	47	21	4	17	18	.....	27	21	0	.....
4	.....	45	0	4	4	19	.....	29	17	0	.....
5	.....	0	0	3	17	20	.....	25	17	0	.....
6	.....	0	0	2	3	21	.....	27	17	0	.....
7	.....	0	0	2	4	22	.....	25	17	0	.....
8	.....	0	29	1	4	23	.....	8	21	0	.....
9	.....	0	25	25	4	24	36	0	25	0	.....
10	38	0	25	21	3	25	.....	0	33	0	.....
11	.....	12	25	17	5	26	.....	0	17	0	.....
12	.....	13	29	0	4	27	.....	0	17	4	.....
13	.....	19	29	0	.....	28	.....	0	17	8	.....
14	.....	21	25	0	.....	29	.....	0	2	13	.....
15	.....	25	21	13	.....	30	.....	0	0	13	.....
						31	.....	0	.....	10	.....

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1906.							1906.						
1	.....	.....	40.0	20.3	9.8	5.2	16	.....	.....	.....	29.5	7	2.3
2	.....	.....	25.0	18.5	10.8	3.7	17	.....	.....	.....	29.5	7	2.3
3	.....	.....	19.3	18.5	9.8	2.3	18	18.9	.....	.....	27.0	7	2.3
4	20	.....	16.5	11.0	9.8	3.0	19	18.9	.....	.....	24.5	7.9	2.3
5	10	.....	44	9.3	10.8	2.3	20	7.5	.....	.....	24.5	7.9	3
6	19.7	.....	40	9.3	12	2.3	21	6.0	.....	.....	22.3	7.9	3
7	.....	.....	44	29.5	10.8	2.3	22	6.0	16.5	29.5	20.5	9	3
8	.....	.....	.....	29.5	9.8	2.3	23	4.5	15.5	35.5	20.5	9	3
9	.....	.....	.....	29.5	9.8	2.3	24	1.0	11.0	29.5	22.5	9	4.5
10	.....	.....	.....	27.0	9	1.8	25	.....	16.5	22.3	27.5	9	5.2
11	.....	.....	.....	22.3	9	1.8	26	.....	27.5	20.3	22.5	9	3.7
12	27.5	.....	.....	20.3	7	1.8	27	.....	29.0	18.5	24.8	9	3.7
13	20.3	.....	.....	14.5	7.9	1.8	28	.....	29.0	29.5	20.5	9	1.8
14	.....	.....	.....	14.5	7.9	1.8	29	.....	44.0	19.3	20.5	10.8	2.3
15	.....	.....	.....	32.5	6.1	1.8	30	.....	48.5	18.5	22.5	12	3
							31	.....	57.0	.....	22.5	9	.....

Day.	Apr.	May.	July.	Aug.	Day.	Apr.	May.	June.	July.	Aug.
1907.					1908.					
1	.....	0.5	9.5	8.6	1	.....	23	8	11	2
2	.....	.5	10.3	8.6	2	.....	25	5	11	2
3	.....	.5	12.0	8.6	3	.....	28	6	13	2
4	.....	.5	7.0	8.6	4	.....	32	6	11	3
5	.....	.....	6.3	8.2	5	.....	30	9	7	3
6	.....	.....	1.5	7.0	6	.....	30	9	4	2
7	.....	.....	3.3	6.3	7	.....	28	9	2	2
8	.....	.....	7.0	5.5	8	2	26	11	1	2
9	.....	.....	7.0	4.8	9	9	26	11	1	2
10	.....	1.0	7.0	4.8	10	2	24	5	0	2
11	.....	1.0	7.0	4.8	11	19	22	4	0	3
12	.....	1.0	6.3	4.8	12	22	22	2	4	4
13	.....	.....	6.3	4.1	13	11	22	1	2	5
14	.....	.....	6.3	4.1	14	9	19	1	1	2
15	.....	.....	5.5	4.1	15	14	19	1	1	1
16	.....	.....	5.5	4.1	16	33	19	1	1	1
17	.....	.....	5.5	1.0	17	29	19	1	1	1
18	.....	.....	4.8	1.0	18	37	22	1	1	1
19	.....	.....	4.1	1.0	19	22	16	2	1	1
20	.....	.....	4.1	.5	20	19	14	1	2	1
21	.....	.....	5.5	.....	21	16	11	4	2	1
22	.....	.....	5.5	.....	22	22	5	3	2	1
23	.....	.....	7.0	.....	23	26	6	4	2	1
24	.....	.....	7.0	.....	24	12	2	3	2	1
25	0.5	.....	7.0	.....	25	12	2	4	2	1
26	.5	.....	7.0	.....	26	14	5	28	2	1
27	.5	.....	7.0	.....	27	15	2	28	2	1
28	.5	.....	7.0	.....	28	17	4	22	3	.....
29	1.0	.....	8.2	.....	29	19	12	16	3	.....
30	.....	.....	8.2	.....	30	21	12	13	3	.....
31	.....	.....	8.2	.....	31	.....	2	.....	3	.....

Daily discharge, in second-feet, of Cook canal near Chinook, Mont., 1905–1917—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Day.	Apr.	May.	June.	July.	Aug.
1909.						1909.					
1	.....	19.6	2.0	5.0	5.0	16	.....	21.2	13.4	1.2	0.8
2	.....	18.3	7.8	2.8	1.7	17	.....	21.2	14.7	.8	.4
3	.....	19.6	17.5	1.7	.4	18	18.3	21.2	12.2	0	.8
4	.....	21.0	17.5	1.7	.4	19	15.7	18.6	14.7	0	1.2
5	.....	18.3	16.1	1.7	0	20	18.3	17.3	13.4	0	5.9
6	.....	18.3	16.1	9.9	0	21	18.3	23.8	14.7	0	4.2
7	.....	22.5	17.5	5.9	0	22	15.7	21.2	13.4	0	5.0
8	.....	23.8	18.9	3.5	0	23	17.0	23.8	7.8	0	3.5
9	.....	17.3	17.5	5.9	0	24	17.0	14.7	5.9	.4	2.2
10	.....	13.5	16.1	2.8	0	25	18.3	8.8	6.8	.8	2.2
11	.....	22.5	17.5	2.2	0	26	18.3	6.0	1.7	2.8	2.8
12	.....	21.2	16.1	.8	0	27	19.6	5.2	1.2	4.2	3.5
13	.....	21.2	12.2	0	.4	28	18.3	8.8	1.2	4.2	4.2
14	.....	19.9	11.0	0	0	29	18.3	5.2	.8	5.0	3.5
15	.....	19.9	8.8	2.8	.4	30	19.6	4.4	.8	5.9	7.8
						31	.....	2.5	.....	5.9	8.8

Day.	Apr.	May.	June.	Day.	Apr.	May.	June.	Day.	Apr.	May.	June.
1910.				1910.				1910.			
1	.....	18.5	4.4	11	.....	8.4	.....	21	21	9.8	.....
2	.....	18.5	4.0	12	.....	7.8	.....	22	21	9.0	.....
3	.....	17.7	3.5	13	.....	7.8	.....	23	21	8.2	.....
4	.....	16.1	3.5	14	.....	7.8	.....	24	21	8.2	.....
5	.....	14.6	.7	15	21	8.4	.....	25	21	9.7	.....
6	.....	13.0	.5	16	21	9.8	.....	26	21	8.7	.....
7	.....	11.3	.2	17	21	9.8	.....	27	21	8.1	.....
8	.....	9.6	.2	18	21	15.4	.....	28	21	7.0	.....
9	.....	7.8	.....	19	21	15.4	.....	29	21	6.5	.....
10	.....	7.8	.....	20	21	15.4	.....	30	21	5.4	.....
								31	.....	4.9	.....

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1911.					1911.				
1	.....	34	37	1.0	16	.....	35	5.8	0.3
2	.....	46	38	1.0	17	.....	33	4.3	.0
3	.....	54	40	.8	18	.....	32	3.1	.0
4	.....	42	38	.4	19	.....	28	2.8	.1
5	.....	38	38	.2	20	.....	25	2.5	.....
6	.....	43	30	.0	21	.....	24	2.3	.....
7	.....	2.1	26	.0	22	.....	22	2.4	.....
8	.....	2.0	22	.0	23	49	22	9.5	.....
9	.....	2.0	20	.0	24	50	30	2.2	.....
10	.....	2.2	17	1.2	25	45	32	3.8	.....
11	.....	1.8	15	3.8	26	40	34	4.5	.....
12	.....	49	11	3.6	27	39	38	8.0	.....
13	.....	42	10	2.7	28	52	38	7.7	.....
14	.....	44	8.8	2.0	29	34	37	2.8	.....
15	.....	42	7.2	1.2	30	34	47	1.6	.....
					31	.....	41	.....	.....

Day.	July.	Aug.	Oct.	Day.	July.	Aug.	Oct.	Day.	July.	Aug.	Oct.
1912.				1912.				1912.			
1	.....	0.6	.....	11	12.5	.....	4.2	21	4.2	.....	.....
2	.....	.6	.....	12	9.8	.....	3.8	22	3.0	.....	.....
3	.....	.6	.....	13	8.7	.....	3.4	23	2.5	.....	.....
4	.....	.5	.....	14	6.8	.....	.....	24	1.8	.....	.....
5	.....	.4	.....	15	5.8	.....	.....	25	1.5	.....	.....
6	.....	.0	4.6	16	8.2	.....	.....	26	1.2	.....	.....
7	5.6	.0	4.6	17	9.5	.....	.....	27	1.0	.....	.....
8	3.0	.0	5.1	18	9.5	.....	.....	28	.5	.....	.....
9	11.5	.....	4.9	19	6.8	.....	.....	29	.4	.....	.....
10	12.5	.....	4.7	20	5.6	.....	.....	30	.3	.....	.....
								31	.5	.....	.....

Daily discharge, in second-feet, of Cook canal near Chinook, Mont., 1905–1917—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1913.							1913.						
1	.....	16	20	15	0.5	0.3	16	.....	25	6.5	10	0	.....
2	.....	17	20	8.7	.5	.2	17	.....	25	4.6	8.3	0	.....
3	.....	17	17	3.9	.6	.....	18	.....	25	3.9	6.6	0	.....
4	.....	17	17	5.4	.5	.....	19	.....	27	3.3	4.9	0	.....
5	.....	19	15	34	.5	.....	20	.....	25	4.6	2.3	.1	.....
6	.....	21	12	5.8	1.0	.....	21	.....	24	6.4	2.3	.2	.....
7	.....	22	9.7	3.2	1.1	.....	22	.....	24	4.6	2.4	.5	.....
8	.....	24	8.7	.5	.8	.....	23	.....	24	3.0	1.9	1.0	.....
9	.....	24	8.1	21	.7	.....	24	.....	22	2.6	1.5	1.2	.....
10	.....	22	8.6	18	.6	.....	25	.....	22	38	1.1	.5	.....
11	.....	22	11	18	.3	.....	26	7.3	21	9.4	3.0	.4	.....
12	.....	30	8.7	15	.2	.....	27	7.0	21	16	2.7	.3	.....
13	.....	30	8.7	14	.2	.....	28	7.0	21	13	3.0	.1	.....
14	.....	29	7.5	7.2	.1	.....	29	14	22	20	1.5	0	.....
15	.....	24	7.6	11	0	.....	30	17	22	25	1.0	0	.....
							31	.....	21	.....	.6	0	.....

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1914.					1914.				
1	.....	37	3.3	1.8	16	60	37	32	.....
2	.....	36	2.8	1.8	17	71	37	19	.....
3	.....	35	2.5	2.0	18	53	29	11	.....
4	.....	33	3.1	3.5	19	45	29	8.9	.....
5	.....	39	3.6	3.5	20	26	24	5.5	.....
6	.....	48	3.8	3.9	21	28	23	3.8	.....
7	.....	45	4.0	2.5	22	31	14	2.5	.....
8	.....	27	4.4	1.5	23	35	14	1.0	.....
9	.....	26	3.6	1.2	24	41	16	.6	.....
10	.....	21	3.1	.5	25	46	15	1.5	.....
11	.....	28	3.6	.2	26	45	10	3.9	.....
12	37	26	4.7	.2	27	43	8.5	1.1	.....
13	41	24	5.3	.1	28	41	7.3	.5	.....
14	35	21	6.7	.0	29	41	6.0	.2	.....
15	48	26	39	.0	30	41	4.9	1.5	.....
					31	.....	4.2	.....	.....

Day.	Apr.	May.	June.	July.	Aug.	Day.	Apr.	May.	June.	July.	Aug.
1915.						1915.					
1	.....	33	27	10.8	1.2	16	22	44	8.4	3.5	.....
2	.....	32	11.5	10.9	.9	17	35	28	8.6	4.0	.....
3	.....	32	11.2	10.6	.7	18	34	22	8.4	10.0	.....
4	.....	19.8	10.8	10.2	1.8	19	34	25	8.5	11.4	.....
5	.....	4.6	10.4	9.8	.3	20	34	30	8.6	9.0	.....
6	.....	29	9.7	9.2	.3	21	32	31	7.2	7.2	0.1
7	10.9	25	23	7.2	.2	22	30	31	6.3	6.0	6.6
8	3.0	23	24	13.1	.1	23	30	29	5.9	5.1	4.9
9	.0	25	26	9.0	.1	24	31	5.6	5.5	3.4	.....
10	.....	23	25	6.7	.2	25	30	1.0	5.1	2.8	.....
11	.....	18.8	24	6.3	.1	26	30	.6	15.9	1.6	.....
12	.....	15.7	23	5.3	.....	27	39	.0	14.5	.7	.....
13	9.1	14.7	22	4.8	.....	28	41	.0	13.3	.5	.....
14	7.9	14.3	22	4.1	.....	29	40	19	10.4	.3	.....
15	8.0	23	20	3.8	.....	30	36	19	10.8	2.0	.....
						31	.....	23	.....	1.5	.....

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Day.	Mar.	Apr.	May.	June.	July.	Aug.
1916.							1916.						
1	.....	.....	28	28	19	3.1	16	.....	.....	26	21	1.3	.....
2	.....	.....	16	2.8	21	3.0	17	.....	.....	25	18	1.2	.....
3	.....	.....	15	35	21	3.1	18	.....	.....	25	15	1.1	.....
4	.....	.....	16	6.4	21	4.3	19	.....	.....	26	18	7.3	.....
5	.....	.....	28	10	16	4.6	20	.....	.....	26	25	5.5	.....
6	.....	.....	32	11	13	4.3	21	.....	.....	28	21	3.1	.....
7	.....	.....	30	7.2	9.9	3.8	22	.....	.....	28	20	2.6	.....
8	.....	.....	28	6.5	5.8	2.2	23	.....	.....	28	28	3.5	.....
9	.....	.....	28	6.5	4.4	.5	24	.....	13	28	32	4.5	.....
10	.....	.....	28	6.5	2.8	.5	25	.....	16	22	30	2.5	.....
11	.....	.....	24	7.5	1.8	.5	26	.....	31	16	29	2.2	.....
12	.....	.....	23	13	4.6	.....	27	18	32	10	27	2.1	.....
13	.....	.....	24	14	3.8	.....	28	33	30	3.1	25	1.8	.....
14	.....	.....	28	18	2.0	.....	29	19	28	1.3	23	1.2	.....
15	.....	.....	25	12	1.5	.....	30	9	28	1.1	20	.9	.....
							31	2	.....	20	.....	3.3	.....

Daily discharge, in second-feet, of Cook canal near Chinook, Mont., 1905–1917—Continued.

Day.	June.	July.	Day.	June.	July.	Day.	June.	July.
1917.			1917.			1917.		
1	.....	22	11	.....	14	21	17	0.6
2	.....	23	12	.....	13	22	16	.4
3	.....	21	13	8.3	11	23	16	.1
4	.....	20	14	8.1	9.7	24	16	.....
5	.....	21	15	6.0	9.0	25	17	.....
6	.....	19	16	7.9	8.1	26	17	.....
7	.....	18	17	9.4	7.8	27	18	.....
8	.....	17	18	7.9	6.9	28	19	.....
9	.....	17	19	15	5.5	29	21	.....
10	.....	15	20	18	1.8	30	22	.....
						31	.....	.....

NOTE.—1906: Head gates closed and no flow in canal Apr. 7–11, 14–17, 25–30, and May 1–21. June 8–21, water entering canal was due to a flood in Battle Creek, was not used for irrigation, but was allowed to run into Milk River at the crossing.

1907, 1908: Canal dry after Aug. 20, 1907, and after Aug. 28, 1908. No flow in canal Apr. 30, May 5–9, 13, 15–16, and 20–31, June 1–11, and after Aug. 21, 1907. Discharge in doubt May 14, 17–19, and June 12–30, 1907.

1910: Daily discharge Apr. 15 to May 1 estimated from known condition of canal regulation. Canal dry beginning June 9.

1911: Head gates opened Apr. 23 and closed July 17.

1913: Head gates opened Apr. 25 and very little flow after Aug. 14.

1914: Head gates opened about Apr. 1. Discharge Apr. 1–11 estimated at 25 second-feet. Canal dry beginning July 14.

1916: Head gates open Mar. 27 to Apr. 1 and Apr. 24 to Aug. 11.

1917: Very little water used owing to delay in making repairs to flume and head gates.

Monthly discharge of Cook canal near Chinook, Mont., 1905–1917.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1905.				
April	.....	.....	37.0	2,202
May	50	0	15.5	953
June	33	0	16.5	982
July	25	0	4.5	277
August 1–12	21	0	9.0	214
The period	.....	.....	.....	4,628
1906.				
April 4–30	27.5	0	5.9	316
May	57.0	0	9.5	584
June (16 days)	44.0	16.5	26.0	826
July	32.5	9.3	22.2	1,360
August	12.0	6.1	9.0	553
September	5.2	1.8	2.7	161
The period	.....	.....	.....	3,000
1907.				
July	12.0	1.5	6.58	405
August 1–20	8.6	.5	5.02	199
The period	.....	.....	.....	604
1908.				
April 8–30	37	2	17.5	798
May	32	2	17.1	1,050
June	28	1	7.30	434
July	13	0	3.26	200
August	5	0	1.58	97
The period	.....	.....	.....	2,580
1909.				
April 18–30	19.6	15.7	17.9	462
May	23.8	2.5	16.8	1,030
June	18.9	.8	11.2	666
July	9.9	0	2.51	154
August	8.8	0	2.10	129
The period	.....	.....	.....	2,440

Monthly discharge of Cook canal near Chinook, Mont., 1905–1917—Continued.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1910.				
April 15–30	21	21	21	666
May	18.5	4.9	10.5	646
June 1–8	4.4	.2	2.12	34
The period				1,350
1911.				
March 30–31				15
April				1,900
May	54	1.8	31.0	1,910
June	40	1.6	14.0	833
July	3.8	0	.59	36
The period				4,690
1912.				
July 7–31	12.5	.3	5.31	263
August 1–8	.6	0	.34	5.4
October 6–13	5.1	3.4	4.41	70
The period				338
1913.				
April 26–30	17	7.0	10.5	104
May	30	16	22.7	1,400
June	38	2.6	10.2	607
July	34	.5	7.54	464
August	1.2	0	.38	23
The period				2,598
1914.				
April	71		36.2	2,150
May	48	4.2	24.2	1,490
June	39	.2	6.22	370
July 1–15	3.9	0	1.51	44.9
The period				4,050
1915.				
April 7–30	41	0	22.4	1,070
May	44	0	20.7	1,270
June	27	5.1	14.2	845
July	13.1	.3	6.15	378
August	6.6	0	.56	34
The period				3,600
1916.				
March 27–31	33	2	16.2	161
April 24–30	32	0	5.93	353
May	32	1.1	22.1	1,360
June	35	2.8	17.9	1,070
July	21	.9	6.18	380
August 1–11	4.6	.5	2.72	59
The period				3,380
1917.				
June	22	6.0	14.4	514
July	23	0	9.06	557
The period				1,070

NOTE.—1905: April, mean discharge estimated from gage readings Apr. 10 and 24.
1910: Apr. 15 to May 1, discharge estimated.
1911: Discharge Mar. 30–31, estimated by ditch rider. The total discharge Apr. 1–22 was estimated by the ditch rider at 1,220 acre-feet. This was added to the computed flow Apr. 23–30 to give the total discharge for the month.

Monthly discharge, in acre-feet, of Cook canal near Chinook, Mont., 1905–1917.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Total.
1905	.....	a 2,200	953	982	277	214	.....	.....	4,630
1906	.....	316	584	826	1,360	553	161	.....	3,000
1907	.....	.....	.....	.....	405	199	.....	.....	604
1908	.....	798	1,050	434	200	97	.....	.....	2,580
1909	.....	462	1,030	666	154	129	.....	.....	2,440
1910	.....	666	646	34	.....	.....	.....	.....	1,350
1911	a 15	a 1,900	1,910	833	36	.....	.....	.....	4,690
1912	.....	.....	.....	.....	263	5.4	.....	70	338
1913	.....	104	1,400	607	464	23	.....	.....	2,600
1914	.....	2,150	1,490	370	44.9	.....	.....	.....	4,050
1915	.....	1,070	1,270	845	378	34	.....	.....	3,600
1916	.....	353	1,360	1,070	380	59	.....	.....	3,380
1917	.....	.....	.....	514	557	.....	.....	.....	1,070
Average	.....	771	899	552	348	101	.....	.....	2,640

a Estimated.

NOTE.—In computing the average flow the canal was assumed dry when no discharge was recorded.

MATHESON CANAL NEAR CHINOOK, MONT.

LOCATION.—In NW. ¼ sec. 29, T. 33 N., R. 20 E., at the highway bridge over the head gate on Battle Creek, one-fourth mile north of the main road and 3½ miles east of Chinook, in Blaine County.

RECORDS AVAILABLE.—April 10, 1905, to December 31, 1917.

GAGE.—Vertical staff nailed to a post on the right bank, about 10 feet below the head gate of the canal; read once a day.

DISCHARGE MEASUREMENTS.—Made by wading below gage.

CHANNEL AND CONTROL.—The bed of the canal is mud; no definite point of control. Weeds grow in the bottom of the canal during the summer months.

EXTREMES OF DISCHARGE.—Maximum discharge recorded for irrigation use, 28 second-feet May 1, 1905. June 7–10, 1906, the canal was bank full, and the discharge was estimated at 28 second-feet.

REGULATION.—The flow is regulated by the head gate at the gage. It also depends on the state of repair of the diversion dam.

ACCURACY.—Stage-discharge relation not permanent, due to growth of vegetal matter in the canal. Numerous discharge measurements are necessary each season to define the rating curves. Records fair.

Discharge measurements of Matheson canal near Chinook, Mont., 1905–1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1905.		*Feet.*	*Sec.-ft.*	1906.		*Feet.*	*Sec.-ft.*
Apr. 10	L. R. Stockman	3.15	25.9	Apr. 6	W. B. Freeman	2.36	7.10
24	Stockman and Morse	2.1	6.8	7	do	2.81	15.3
May 17	H. M. Morse	1.76	2.9	9	do	2.30	7.62
June 3	do	2.52	8.0	23	Freeman and Morse	1.92	4.63
17	Stockman and Prall	2.85	9.1	May 5	W. B. Freeman	1.75	2.37
23	C. T. Prall	3.17	12.7	23	do	2.65	10.3
23	do	3.05	11.5	28	do	2.83	11.8
July 8	Freeman and Morse	1.85	.7	June 5	Freeman and Hartman	2.61	8.80
15	C. T. Prall	2.29	4.0	26	do	2.12	2.49
21	W. B. Freeman	1.76	.5	July 19	H. M. Morse	2.51	7.04
27	H. M. Morse	2.72	8.0	24	W. S. Hartman	2.11	.37
Aug. 11	do	1.79	1.0	Aug. 11	Morse and Hartman	1.95	.25
19	C. T. Prall	1.45	.25	25	W. S. Hartman	2.70	2.27
				Sept. 3	do	3.10	4.71
				21	do	2.97	5.42

Discharge measurements of Matheson canal near Chinook, Mont., 1905–1917—Continued.

Date.	Made by—	Gage height.	Discharge.
1908.		*Feet.*	*Sec.-ft.*
Apr. 6	Stewart and Huch	.....	0
25	A. F. Huch	3.23	13.9
May 4	....do	2.16	4.5
11	....do	1.85	.5
15	J. E. Stewart	2.24	3.7
26	A. F. Huch	2.58	6.2
June 3	....do	2.31	2.2
13	....do	3.07	7.8
23	....do	3.00	.6
July 7	....do	2.37	.9
16	....do	2.18	.6
1909.			
Apr. 21	W. A. Lamb	2.25	6.6
May 3	....do	2.20	6.2
18	....do	2.45	7.0
June 9	....do	2.55	5.8
26	....do	2.30	2.0
July 14	....do	2.10	.3
Aug. 1	....do	2.30	1.2
1910.			
Apr. 29	M. E. McChristie	2.18	4.3
May 6	....do	2.00	2.5
16	....do	1.90	1.9
20	....do	1.84	1.0
25	....do	1.88	1.2
1911.			
Apr. 12	J. C. Beebe	.....	8.7
14	....do	3.6	9.3
May 2	....do	3.19	5.9
9	....do	3.42	7.1
13	....do	3.00	4.5
20	....do	3.10	2.71
26	....do	2.90	3.8
June 11	....do	2.70	1.3
22	....do	2.29	.5
28	....do	2.32	1.8
1912.			
June 25	R. R. Randell	2.98	.61
July 25	....do	3.20	1.38
Aug. 28	....do	3.28	.19
1913.			
Apr. 26	J. B. Stewart	3.63	8.0
May 2	....do	3.50	7.0
20	....do	3.48	4.3
June 16	....do	3.28	2.2
28	....do	3.90	3.8
July 11	....do	3.45	1.9
25	....do	3.50	1.2
Aug. 5	....do	3.52	.3
11	....do	3.45	.1
1914.			
Apr. 29	B. E. Jones	3.99	9.4
May 4	....do	3.62	5.8
9	....do	3.47	4.9
16	....do	3.64	5.6
May 25	....do	3.26	2.3
27	....do	3.18	1.6
June 2	....do	2.85	.12
8	....do	2.71	.01
22	....do	2.76	.02
30	....do	3.06	.75
1915.			
Apr. 26	B. E. Jones	.....	Dry.
May 3	....do	3.02	.04
10	....do	3.38	1.5
19	....do	3.73	4.5
June 3	....do	3.72	3.6
16	....do	4.00	5.6
29	....do	3.67	2.0
July 6	....do	3.77	2.8
22	....do	3.66	.1
Aug. 2	....do	3.53	2.0
9	....do	3.08	.07
1916.			
June 16	A. H. Tuttle	3.50	.93
1917.			
July 14	....do	3.95	7.0

NOTE.—1905: June 23, grass removed from canal bed. Discharge estimated, Aug. 11, 1906, May 11, 1908, June 11, 1911, Aug. 5 and 11, 1913, June 8 and 22, 1914, May 3 and July 22, 1915.
1907: Station was visited by an engineer May 10 and 25, June 4, July 6 and 27, and Aug. 19, and each time there was no flow.
1908: June 23, stage-discharge relation affected by backwater from beaver dam.
1911: April 12, there was no gage in the canal at time of measurement.
1915: July 22, the flow represents the seepage through a beaver dam below gage.

Daily discharge, in second-feet, of Matheson canal near Chinook, Mont., 1905–1917.

Day.	Apr.	May.	June.	July.	Aug.	Day.	Apr.	May.	June.	July.	Aug.
1905.						1905.					
1	26	28	9	7	0.5	16	15	4	8	5	0.3
2	26	20	8.5	7	.4	17	14	3	9	5	.7
3	26	27	8.5	5	.3	18	14	7	7	1	.7
4	26	20	8.5	6	.3	19	13	8	6	1	.5
5	26	18	8.5	2	.3	20	13	8.5	6	1	.3
6	26	18	8.5	2	.3	21	13	9	8	1	.3
7	26	16	8.5	1	.0	22	20	9	8	3	.6
8	26	15	8.5	1	.0	23	22	8	12	1	.....
9	26	14	8.5	4	.0	24	7	8	11	1	.....
10	27	12	8.5	9	1.0	25	6	8	11	1	.....
11	27	9	8	9	1.0	26	6	8	10	5	.....
12	26	9	8	7	.7	27	6	8.5	9	8	.....
13	25	7.5	8	6	.5	28	7	9	9	1	.....
14	21	6	8	4	.3	29	23	9	7	1	.....
15	16	5	8	4	.3	30	27	9	11	.5	.....
						31	.....	9	.....	.5	.....

Daily discharge, in second-feet, of Matheson canal near Chinook, Mont., 1905–1917—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1906.							1906.						
1	3.5	1.0	9.9	3.4	0.2	6.1	16	5.7	.....	5.1	.....	.....	7.3
2	3.5	3.0	17.7	1.5	.....	5.0	17	9.3	.....	4.5	8.5	.....	7.3
3	3.5	3.0	17.7	1.5	.....	6.1	18	6.8	.....	4.5	9.9	.....	6.1
4	3.5	3.0	11.4	.8	.....	6.1	19	2.3	.....	4.5	5.7	0.2	5.0
5	4.0	2.7	7.1	.2	.....	7.3	20	6.8	.....	3.9	4.5	4.0	5.0
6	7.0	.....	9.9	.2	.....	6.1	21	6.8	12.5	3.4	7.1	3.0	5.0
7	15.3	.....	28	.....	.....	6.1	22	6.8	14.0	3.4	4.5	4.0	5.0
8	12.0	.....	28	.....	.....	6.1	23	3.8	10.3	3.4	2.3	5.0	4.0
9	8.0	.....	28	.2	.2	6.1	24	2.3	11.0	3.4	.....	5.0	4.0
10	8.0	.....	28	16.0	.2	2.3	25	2.3	12.9	3.4	.....	6.1	5.0
11	13.6	.....	9.9	16.0	.....	2.3	26	2.3	17.7	3.4	.....	4.0	5.0
12	13.6	.....	9.9	12.9	.....	4.0	27	2.3	17.7	3.4	.....	3.0	5.0
13	12.2	.....	7.8	9.9	.....	5.0	28	1.7	11.4	3.4	.....	3.0	4.0
14	4.7	.....	7.1	.2	.....	6.1	29	1.7	14.5	2.3	.2	2.3	1.6
15	4.7	.....	5.7	.2	.....	6.1	30	1.0	17.7	2.3	.4	4.0	1.6
							31	.....	17.7	.....	.2	5.0	.....

Day.	Apr.	May.	June.	July.	Aug.	Day.	Apr.	May.	June.	July.	Aug.
1908.						1908.					
1	.....	5	3	2	3	16	15	2	4	.....	2
2	.....	5	2	2	3	17	15	3	4	.....	1
3	.....	2	3	2	3	18	16	4	4	.....	1
4	.....	3	3	1	2	19	11	4	4	.....	1
5	.....	2	5	1	2	20	16	3	3	.....	1
6	.....	1	6	1	1	21	15	1	2	.....	1
7	.....	0	7	1	.....	22	7	2	1	.....	1
8	7	0	7	.....	.....	23	11	3	1	.....	1
9	11	0	5	.....	.....	24	7	6	2	.....	1
10	12	1	4	.....	.....	25	14	6	2	.....	1
11	11	1	5	.....	.....	26	15	6	2	.....	.....
12	9	0	7	.....	.....	27	5	6	2	.....	.....
13	11	2	8	.....	.....	28	3	6	2	.....	.....
14	10	1	6	.....	.....	29	4	6	2	1	.....
15	11	3	5	.....	.....	30	5	5	2	1	.....
						31	.....	3	.....	1	.....

Day.	Apr.	May.	June.	July.	Aug.	Day.	Apr.	May.	June.	July.	Aug.
1909.						1909.					
1	.....	8.8	4.6	1.2	1.2	16	7.0	6.8	0.9	3.5	.....
2	6.2	9.7	4.5	6	.....	17	4.6	6.7	4.5	2.6	.....
3	11.5	7.9	11.3	0	.....	18	7.0	6.7	5.2	2.6	.....
4	7.9	8.7	8.5	0	.....	19	6.2	6.6	5.9	4.1	.....
5	7.9	7.7	8.5	.6	.....	20	6.2	6.5	8.4	2.6	.....
6	7.9	6.7	8.5	4.5	.....	21	7.0	8.8	13.1	1.9	.....
7	7.0	13.0	4.0	1.7	.....	22	10.6	5.2	4.8	1.9	.....
8	7.0	12.8	6.4	.3	.....	23	11.5	9.6	3.1	1.2	.....
9	4.6	10.8	5.8	.9	.....	24	12.5	8.7	3.0	0	.....
10	4.0	9.9	5.2	2.1	.....	25	7.9	6.9	3.0	0	.....
11	4.0	12.7	5.2	1.4	.....	26	7.9	5.8	7.0	0	.....
12	4.0	9.8	5.0	0	.....	27	8.8	5.8	2.0	2.6	.....
13	3.4	7.0	4.9	0	.....	28	8.8	6.6	2.0	9.4	.....
14	3.4	7.0	3.3	.3	.....	29	8.8	7.5	1.3	6.7	.....
15	2.9	6.1	.9	1.9	.....	30	7.0	6.2	.3	3.4	.....
						31	.....	5.4	.....	2.6	.....

Day.	Apr.	May.	June.	Day.	Apr.	May.	June.	Day.	Apr.	May.	June.
1910.				1910.				1910.			
1	.....	5.2	0.7	11	.....	2.5	2.5	21	3	0.9	.....
2	.....	2.5	.5	12	.....	2.5	2.5	22	4	.9	.....
3	.....	1.6	.5	13	.....	2.5	1.6	23	4	.9	.....
4	.....	1.6	.5	14	.....	2.5	1.2	24	4	.9	.....
5	.....	1.6	5.8	15	.....	2.5	.5	25	4	1.6	.....
6	.....	2.5	5.8	16	.....	1.6	.5	26	4	1.6	.....
7	.....	1.6	5.8	17	.....	1.6	.....	27	5	.9	.....
8	.....	.9	5.8	18	3	1.6	.....	28	5	.9	.....
9	.....		2.5	19	3	1.6	.....	29	5	.9	.....
10	.....		2.5	20	3	.9	.....	30	5	.9	.....
								31	.....	.9	.....

Daily discharge, in second-feet, of Matheson canal near Chinook, Mont., 1905–1917—Continued.

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1911.					1911.				
1	.....	7 2	5.6	1.7	16	.....	1.0	0.6	1.7
2	.....	5.6	5.4	1.5	17	.....	4.4	.6	1.5
3	.....	6.4	5.2	1.3	18	.....	3.4	.6	1.3
4	.....	6.4	5.6	1.2	19	.....	3.0	.6	1.2
5	.....	5.8	5.4	1.3	20	.....	2.8	.6	1.5
6	.....	5.6	5.1	1.5	21	.....	1.7	.3	1.1
7	.....	7.8	5.3	1.3	22	.....	1.7	.6	1.2
8	.....	7.6	4.0	1.3	23	9.8	3.7	.3	1.4
9	.....	7.2	4.2	1.2	24	9.9	3.1	.4	1.7
10	.....	7.6	2.5	1.3	25	8.4	2.8	.4	1.3
11	.....	7.4	2.2	2.6	26	9.3	3.4	1.4	1.3
12	.....	6.0	2.6	2.6	27	10.0	5.6	1.3	.....
13	.....	4.6	1.2	2.1	28	8.2	5.6	1.7	.....
14	.....	4.2	.9	1.8	29	8.0	5.2	1.7	.....
15	.....	.9	.6	1.7	30	7.6	6.0	1.8	.....
					31	.....	6.0	.....	.....

Day.	June.	July.	Aug.	Sept.	Oct.	Day.	June.	July.	Aug	Sept.	Oct.
1912.						1912.					
1	3.0	1.9	1.4	0.2	0.7	16	15.6	2.0	0.0	0.7	.....
2	3.0	1.9	1.1	.1	.7	17	15.6	1.9	.0	.8	.....
3	3.0	11.1	.9	.1	.6	18	15.6	1.9	.0	.7	.....
4	3.0	15.6	.7	.1	.8	19	13.8	2.2	.1	.5	.....
5	3.0	6.6	.4	.1	.9	20	13.8	2.3	3.3	.5	.....
6	.6	3.0	.8	.2	.9	21	11.1	1.9	2.1	.5	.....
7	.6	2.4	1.2	.2	.9	22	6.6	1.9	1.9	.5	.....
8	.6	1.9	2.3	.2	1.0	23	3.0	1.6	1.7	.5	.....
9	.6	1.4	1.3	.2	1.2	24	.6	1.6	1.4	.5	.....
10	.6	1.0	1.1	.2	1.3	25	.6	1.4	.6	.5	.....
11	.6	.6	.5	.2	1.6	26	.4	1.4	.5	.6	.....
12	.6	.6	.2	.2	1.3	27	1.9	1.4	.3	.9	.....
13	.6	1.9	.1	.3	.....	28	1.9	1.4	.2	1.0	.....
14	9.3	1.9	.0	.4	.....	29	2.4	1.5	.2	.9	.....
15	15.6	1.9	.0	.5	.....	30	1.9	1.6	.5	.7	.....
						31	.....	1.4	.4	.....	.....

Day.	Apr.	May.	June.	July.	Aug.	Day.	Apr.	May.	June.	July.	Aug.
1913.						1913.					
1	.....	7.8	0.5	6.2	0.2	16	.....	4.1	2.0	0.6	.....
2	.....	7.0	.4	5.5	.2	17	.....	4.0	1.8	.5	.....
3	.....	6.4	.5	4.5	.1	18	.....	4.2	1.5	.6	.....
4	.....	4.8	0	4.9	.3	19	.....	4.1	1.3	.6	.....
5	.....	3.9	1.6	13.1	.3	20	.....	4.3	2.2	1.2	.....
6	.....	4.1	3.9	8.4	.2	21	.....	3.7	2.6	0	.....
7	.....	4.7	3.8	5.9	0	22	.....	3.7	3.3	1.3	.....
8	.....	3.9	3.7	4.5	.....	23	.....	3.7	3.7	.9	.....
9	.....	3.4	3.7	2.1	.....	24	.....	3.6	3.6	1.3	.....
10	.....	3.6	3.4	2.1	.....	25	.....	3.9	5.8	1.2	.....
11	.....	3.4	1.9	2.2	.....	26	7.0	4.2	4.8	1.3	.....
12	.....	3.3	3.9	1.6	.....	27	7.4	3.6	3.9	.9	.....
13	.....	3.5	4.3	1.3	.....	28	7.8	2.6	3.8	1.4	.....
14	.....	3.7	3.6	1.0	.....	29	7.8	1.3	5.3	.6	.....
15	.....	4.3	2.4	.8	.....	30	7.8	1.0	6.2	.6	.....
						31	.....	.7	.....	.3	.....

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1914.					1914.				
1	.....	7.5	0.3	0.4	16	17	5.8	5.6	.....
2	.....	6.6	.11	.3	17	24	5.7	3.5	.....
3	.....	6.3	.10	.2	18	22	5.3	1.0	.....
4	.....	5.2	.12	.12	19	21	4.4	.6	.....
5	.....	14	.06	.10	20	19	3.8	.4	.....
6	.....	9.9	.09	.10	21	17	3.8	.12	.....
7	.....	6.7	.06	.03	22	14	2.8	.05	.....
8	.....	5.1	.03	.01	23	12	2.6	.02	.....
9	.....	4.9	.01	.00	24	9.5	2.6	.01	.....
10	.....	4.4	.00	.....	25	11	2.4	.5	.....
11	.....	4.7	.01	.....	26	11	2.2	1.0	.....
12	7.1	4.8	.04	.....	27	9.5	1.9	1.0	.....
13	15	4.8	.03	.....	28	9.0	1.4	1.1	.....
14	11	4.5	.06	.....	29	8.6	.8	1.2	.....
15	15	4.5	2.8	.....	30	8.4	.4	.8	.....
					31	.....	.3	.....	.....

Daily discharge, in second-feet, of Matheson canal near Chinook, Mont., 1905–1917—Continued.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Day.	Mar.	Apr.	May.	June.	July.	Aug.
1915.							1915.						
1	.....	30	0.0	8.2	1.7	2 7	16	.....	.....	18.9	5.6	2.5	0.0
2	.....	27	.1	10.2	1.7	2.0	17	.....	.....	20	4.6	2.6	.8
3	.....	24	.2	3.4	1.5	1.9	18	.....	.....	8.9	4.2	5.5	1.3
4	.....	20	.7	3.5	2.4	2.6	19	.....	.....	5.8	4.2	4.9	1.0
5	.....	11.6	5.3	4.5	2.6	2.4	20	.....	.....	1.7	4.0	1.0	1.1
6	.....	8.9	4.2	7.0	3.0	1.4	21	.....	.....	3.4	3.4	.6	1.2
7	.....	8.9	2.3	8.9	3.0	.8	22	.....	.....	2.2	3.3	.1	5.5
8	.....	5.8	1.7	14.8	3.1	.4	23	.....	.....	1.7	4.1	.0	1.0
9	.....	3.1	1.6	14.0	3.0	.1	24	.....	.....	17.1	3.4	.1	.2
10	.....	1.6	1.4	12.3	2.4	.0	25	.....	.....	16.4	3.0	.0	.....
11	.....	.7	1.1	9.6	5.6	.....	26	.....	.....	15.4	2.4	.0	.....
12	.....	.3	.7	8.0	3.0	.....	27	.....	.....	13.8	2.3	.1	.....
13	.....	.0	.7	6.4	2.8	.....	28	.....	.....	8.4	2.3	.0	.....
14	.....	.....	.7	5.8	2.5	.....	29	.....	.....	6.1	2.1	.0	.....
15	.....	.....	2.3	5.3	2.4	.....	30	.....	.....	6.9	2.2	3.9	.....
							31	.....	14.0	.....	7.4	.....	3.3	.....

Day.	Mar.	June.	July.	Aug.	Day.	Mar.	June.	July.	Aug.	Day.	Mar.	June.	July.	Aug.
1916.					1916.					1916.				
1	.....	3.8	12.7	1.5	11	.....	0.6	.....	.....	21	.....	8.1	.....	.....
2	.....	8.9	2.7	.....	12	.....	.5	.....	.....	22	.....	8.1	.....	.....
3	.....	11.7	2.2	.....	13	.....	.5	.....	.....	23	.....	7.4	.....	.....
4	.....	5.7	1.7	.....	14	.....	9.6	.....	.....	24	.....	7.0	.....	.....
5	.....	.6	1.6	.....	15	.....	2.3	.....	.....	25	.....	5.9	.....	.....
6	.....	.....	1.4	.....	16	.....	.8	.....	.....	26	.....	5.7	.....	.....
7	.....	.....	2.2	.....	17	.....	.....	.....	.....	27	2.3	7.2	0.7	.....
8	.....	.....	1.1	.....	18	.....	.....	.....	.....	28	3.3	5.5	.6	.....
9	.....	1.6	.5	.....	19	.....	.....	.....	.....	29	4.3	8.5	1.1	.....
10	.....	1.7	.....	.....	20	.....	5.0	.....	.....	30	1.6	5.9	2.3	.....
										31	.....	.....	1.0	.....

Day.	June.	July.	Day.	June.	July.	Day.	June.	July.
1917.			1917.			1917.		
1	.....	0.6	11	.....	6.1	21	.....	4.2
2	.....	.7	12	.....	6.8	22	.....	3.7
3	.....	3.0	13	.....	7.0	23	.....	2.3
4	.....	3.2	14	.....	7.2	24	.....	2.0
5	.....	3.7	15	.....	7.6	25	.....	1.5
6	.....	5.4	16	.....	7.2	26	0	1.4
7	.....	6.4	17	.....	6.3	27	1.8	1.1
8	.....	7.4	18	.....	6.9	28	2.3	.7
9	.....	6.8	19	.....	7.4	29	2.7	.....
10	.....	5.1	20	.....	5.4	30	.9	.....
						31	.....	.....

NOTE.—1905: Apr. 1–9, daily discharge estimated.

1906: May 6–20 and Aug. 2–8 and 11–18, canal dry. June 7–10, the canal was bank full, due to the flood in Battle Creek; discharge equal to the capacity of the canal was assumed. Apr. 1–5, daily discharge estimated. Apr. 8, no gage height reported and no discharge given in previous published report. Discharge for this day estimated as hydrographer states in his report that there was a continuous flow from the beginning of the season.

1907: Practically no flow at this station. (See footnote to discharge measurements.)

1908: Daily discharge obtained by direct comparison of discharge measurements and gage heights, and although the percentage of error may be high the results are probably fair. No discharge July 8–28, Aug. 7–15, and after Aug. 26.

1910: Head gates opened Apr. 18; daily discharge Apr. 18–30 estimated from known conditions of regulation. Canal dry beginning June 17.

1911: Apr. 1–22, total discharge estimated at 350 acre-feet by ditch rider.

1913: Head gates were opened Apr. 3, and the flow remained practically constant to Apr. 26, when gage observations were begun; mean discharge Apr. 4–25 estimated at 8 second-feet. No water running in the canal after Aug. 7.

1914: Water turned into ditch about Apr. 1, but did not have much head. Discharge Apr. 1–11 estimated 4 second-feet. Canal dry beginning July 9.

1915: High water of Apr. 1–3 due to washing out of head gates; water not used for irrigation; discharge estimated from observer's notes. Canal dry Apr. 13 to May 1 and beginning Aug. 25.

1916: Dam washed out and partly replaced in April; washed out again in June and not replaced during balance of year. Canal dry Apr. 1 to May 31, June 7, 8, 17–19, July 10–26, and after Aug. 2. Water in canal represents overflow from Battle Creek through gates, as canal was not used for irrigation in 1916.

1917: Dam and head gates were badly damaged by floods during the spring, this damage accounting for the small quantity of water diverted in 1917.

Monthly discharge of Matheson canal near Chinook, Mont., 1905–1917.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1905.				
April	27	6.0	19.0	1,131
May	28	3.0	11.0	676
June	12	6.0	9.0	536
July	9	.5	3.5	215
August 1–22	1	0	.4	17
The period				2,575
1906.				
April	15.3	1.0	6.0	357
May	17.7	0	5.5	338
June	28.0	2.3	9.3	553
July	16.0	0	3.4	209
August	6.1	0	1.6	98
September	7.3	1.6	5.1	304
The period				1,860
1908.				
April 8–30	16	3	10.5	479
May	6	0	2.97	183
June	8	1	3.77	224
July	2	0	.419	26
August	3	0	.806	50
The period				962
1909.				
April 2–30	12.5	2.9	7.02	404
May	13.0	5.2	8.01	493
June	13.1	.3	5.04	300
July	9.4	0	1.95	120
August	1.2	0	.04	2.5
The period				1,320
1910.				
April 18–30	5.0	3.0	4.0	103
May	5.2	.9	1.73	106
June 1–16	5.8	.5	2.45	78
The period				287
1911.				
March 27–31				30
April				491
May	7.8	0.9	4.83	297
June	5.6	.3	2.29	136
July	2.6	0	1.28	78.7
The period				1,030
1912.				
June	15.6	.4	4.98	296
July	15.6	.6	2.62	161
August	3.3	.0	.81	49.8
September	1.0	.1	.43	25.6
October 1–12	1.6	.6	.99	23.6
The period				556
1913.				
April 4–30			7.92	424
May	7.8	.7	3.89	239
June	6.2	0	2.98	177
July	13.1	0	2.50	154
August	.3	0	.22	3
The period				997
1914.				
April	24		10.3	613
May	14	.3	4.52	278
June	5.6	0	.71	42.2
July 1–9	.4	0	.14	2.5
The period				936

Monthly discharge of Matheson canal near Chinook, Mont., 1905–1917—Continued.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1915.				
April	30	0	4.73	281
May	20	0	5.71	351
June	14.8	2.1	5.77	343
July	5.6	0	2.11	130
August 1–24	5.5	0	1.10	52
September				
The period				1,160
1916.				
March 27–31	4.3	0	2.30	22.8
June	11.7	0	4.09	243
July	12.7	0	1.03	63.3
The period				329
1917.				
June 26–30	2.7	0	1.54	15.3
July	7.6	0	4.10	252
The period				267

NOTE.—1907: Practically no flow. (See footnote to discharge measurements.)
1911: Total discharge Mar. 27–31 and Apr. 1–22 estimated by ditch rider at 30 acre-feet and 350 acre-feet, respectively.
1913: Mean discharge estimated Apr. 4–25.
1914: Apr. 1–11, mean discharge estimated. (See footnote to daily discharge.)
Condition of dam prevented diversion of much water in 1916 or 1917.

Monthly discharge, in acre-feet, of Matheson canal near Chinook, Mont., 1905–1917.

Year.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Total.
1905		1,130	676	536	215	17			2,570
1906		357	338	553	209	98	304		1,860
1908		479	183	224	26	50			962
1909		404	493	300	120	2.5			1,320
1910		103	106	78					287
1911	[a] 30	[b] 491	297	136	78.7				1,030
1912				296	161	49.8	25.6	23.6	556
1913		424	239	177	154	3			997
1914		613	278	42.2	2.5				936
1915		281	351	343	130	52			1,160
1916				243	63.3				306
1917				15.3	252				267
Average		357	247	245	118	23			1,020

[a] Estimated. [b] Partly estimated.

NOTE.—Condition of dam prevented diversion of much water in 1916 or 1917. In computing the average flow the canal was assumed dry when no discharge was recorded. April, 1904, being previous to the establishment of the station, was omitted in computing the average.

WOOD & ANDERSON SOUTH DITCH FROM WHITE MUD COULEE, SASK.

[Called Wood & Anderson east ditch in Hydrometric Surveys, 1915, p. 358.]

LOCATION.—In the SE. ¼ sec. 22, T. 7, R. 29 W. third meridian.

RECORDS AVAILABLE.—No water used in 1914; 3 acre-feet used May 24–25, 1915; no water used 1916–17.

GAGE.—Vertical staff; read by D. Wood.

DISCHARGE MEASUREMENTS.—Made with 36-inch rectangular weir set permanently in ditch, 10 feet below gage.

CHANNEL AND CONTROL.—Bed of ditch gravel and clay; control, 36-inch weir.

WOOD & ANDERSON DITCH NEAR COULEE, SASK.

LOCATION.—In NE. ¼ sec. 21, T. 7, R. 29 W. third meridian, about 150 feet west of ranch house.

RECORDS AVAILABLE.—Complete records for 1915; no water used 1916–17.

GAGE.—Vertical staff; read by D. Wood.

DISCHARGE MEASUREMENTS.—Made at station with a 24-inch rectangular weir, placed permanently in ditch, 10 feet below gage.

CHANNEL AND CONTROL.—Bed of channel clay; control 24-inch weir.

ACCURACY.—Stage-discharge relation permanent.

Daily discharge, in second-feet, of Wood & Anderson ditch near Coulee, Sask., 1915.

Day.	May.	June.	July.	Day.	May.	June.	July.	Day.	May.	June.	July.
1	.....	0.31	0.31	11	.....	.....	.....	21	.....	.....	.....
2	.....	.....	.27	12	.....	.....	.....	22	.....	0.27	.....
3	.....	.....	.21	13	.....	.....	.....	23	0.58	.42	.....
4	.....	.....	.21	14	.....	.....	.....	24	.67	.42	.....
5	.....	.....	.24	15	.....	.....	.....	25	.54	.34	.....
6	.....	.....	.21	16	.....	.....	.....	26	.72	.31	.....
7	.....	.....	.24	17	.....	.....	.....	27	.21	.31	.....
8	.....	.....	.....	18	.....	.....	.....	28	.31	.34	.....
9	.....	.....	.....	19	.....	.....	.....	29	.76	.31	.....
10	.....	.....	.....	20	.....	.....	.....	30	.27	.31	.....
								31	.34	.....	.....

Monthly discharge of Wood & Anderson ditch near Coulee, Sask., 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
May 23–31	0.72	0.21	0.49	9
June 1, 23–30	.42	.27	.37	6
July 1–7	.31	.21	.24	3
The period	.....	.....	.....	18

SPANGLER DITCH NEAR BATTLE CREEK, SASK.

LOCATION.—In SW. ¼ sec. 6, T. 7, R. 28 W. third meridian, about one-quarter mile below intake of ditch, on Sixmile Creek.

RECORDS AVAILABLE.—1912–1915; no water used in 1916; 1917.

GAGE.—Vertical staff; observer, J. M. Spangler.

DISCHARGE MEASUREMENTS.—Made with weir or current meter.

CHANNEL AND CONTROL.—Bed of ditch, clay.

ACCURACY.—Rating table made from curve based on three discharge measurements taken in 1914, well defined between 0.30 and 1 second-foot, poorly defined above 1 second-foot. Records fair.

Discharge measurements of Spangler ditch near Battle Creek, Sask., 1911–1914, and 1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1911.		*Feet.*	*Sec.-ft.*	1913.		*Feet.*	*Sec.-ft.*
July 4	M. H. French	.....	3.21	June 2	H. D. St. A. Smith	0.54	1.62
31	....do	0.67	1.50	4	H. O. Brown	.43	1.67
1912.				10	....do	.56	1.29
June 4	G. R. Elliott	.58	2.50	1914.			
17	O. H. Hoover	.73	3.09	May 28	H. W. Rowley	1.49	.95
19	....do	.50	2.31	June 23	....do	1.44	.58
July 12	G. R. Elliott	.63	2.48	Nov. 4	....do	1.39	.36
				1917.			
				June 14	....do	.....	0

Daily discharge, in second-feet, of Spangler ditch near Battle Creek, Sask., 1912–1917.

Day.	June.	July.	Aug.	Day.	June.	July.	Aug.	Day.	June.	July.	Aug.
1912.				1912.				1912.			
1	.....	2.52	0.60	11	1.88	2.52	.....	21	.....	1.88	.....
2	.....	2.52	.60	12	1.88	2.52	.....	22	.....	1.88	.....
3	.....	2.52	.60	13	1.88	2.52	.....	23	.....	1.88	.....
4	2.52	2.52	.....	14	1.88	2.52	.....	24	.....	1.56	.....
5	2.52	2.52	.....	15	3.16	2.52	.....	25	2.52	1.56	.....
6	2.52	2.52	.....	16	3.16	2.84	.....	26	2.52	1.56	.....
7	2.20	2.52	.....	17	3.16	2.52	.....	27	2.52	1.24	.....
8	2.20	2.52	.....	18	3.16	2.20	.....	28	2.52	.60	.....
9	2.20	2.52	.....	19	.....	2.20	.....	29	2.52	.60	.....
10	1.88	2.52	.....	20	.....	2.20	.....	30	2.52	.60	.....
								31	2.52	.60	.....

Day.	May.	June.	July.	Day.	May.	June.	July.	Day.	May.	June.	July.
1913.				1913.				1913.			
1	.....	1.80	.....	11	.....	0.74	0.16	21	.....	0.12	.....
2	.....	1.80	.....	12	.....	1.40	.16	22	.....	.12	.....
3	.....	2.00	.....	13	.....	1.72	.16	23	0.50	.68	.....
4	.....	2.24	.....	14	.....	2.02	.16	24	1.80	1.00	.....
5	.....	2.12	.....	15	.....	2.02	.16	25	2.10	1.00	.....
6	.....	1.96	0.16	16	.....	1.72	.16	26	2.10	.....	.....
7	.....	1.80	.16	17	.....	1.40	.48	27	1.80	.....	.....
8	.....	1.66	.16	18	.....	1.06	.48	28	1.80	.....	.....
9	.....	1.52	.16	19	.....	.74	.48	29	1.48	.....	.....
10	.....	1.06	.16	20	.....	.36	.....	30	1.48	.....	.....
								31	1.48	.....	.....

Day.	May.	June.	July.	Day.	May.	June.	July.	Day.	May.	June.	July.
1914.				1914.				1914.			
1	.....	1.91	0.54	11	.....	4.00	.....	21	2.00	.....	.....
2	.....	1.55	.35	12	.....	4.20	.....	22	2.00	1.55	.....
3	.....	1.91	.23	13	.....	.....	.....	23	2.30	.64	.....
4	1.55	3.60	.15	14	.....	.....	.....	24	2.20	.30	.....
5	0	4.40	.....	15	.....	.....	.....	25	1.45	.64	.....
6	0	5.00	.....	16	.....	.....	.....	26	.80	2.20	.....
7	1.45	4.40	.....	17	.....	.....	.....	27	.96	1.55	.....
8	1.35	4.20	.....	18	.....	.....	.....	28	.96	1.24	.....
9	2.00	4.10	.....	19	.....	.....	.....	29	.96	1.04	.....
10	.....	4.00	.....	20	.....	.....	.....	30	.80	.80	.....
								31	.88	.....	.....

Day.	May.	July.	Aug.	Day.	May.	July.	Aug.	Day.	May.	July.	Aug.
1915.				1915.				1915.			
1	.....	.....	0.64	11	1.67	.....	.....	21	.....	.....	.....
2	.....	.....	.40	12	1.45	.....	.....	22	.....	.....	.....
3	.....	.....	.23	13	1.79	.....	.....	23	.....	3.20	.....
4	.....	.....	.....	14	.....	.....	.....	24	.....	2.90	.....
5	.....	4.70	.....	15	.....	.....	.....	25	.....	2.60	.....
6	.....	4.40	.....	16	.....	.....	.....	26	.....	3.00	.....
7	.....	4.40	.....	17	.....	.....	.....	27	.....	3.40	.....
8	.....	4.80	.....	18	.....	.....	.....	28	.....	3.00	.....
9	.....	.....	.....	19	.....	.....	.....	29	.....	3.00	.....
10	1.79	.....	.....	20	.....	.....	.....	30	.....	3.00	.....
								31	.....	1.91	.....

Daily discharge, in second-feet, of Spangler ditch near Battle Creek, Sask., 1912–1917— Continued.

Day.	June.	July.	Aug.	Day.	June.	July.	Aug.	Day.	June.	July.	Aug.
1917.				1917.				1917.			
1	.....	5.60	2.2	11	.....	2.20	.....	21	.....	5.90	.....
2	.....	5.60	2.2	12	.....	1.67	.....	22	.....	5.80	.....
3	.....	5.80	2.6	13	.....	1.45	.....	23	.....	5.30	.....
4	.....	5.80	2.9	14	.....	1.04	.....	24	2.6	4.20	.....
5	.....	5.90	.....	15	.....	1.04	.....	25	3.6	3.50	.....
6	.....	5.90	.....	16	.....	1.25	.....	26	4.6	3.20	.....
7	.....	5.20	.....	17	.....	1.55	.....	27	5.8	2.90	.....
8	.....	4.10	.....	18	.....	2.40	.....	28	5.6	2.80	.....
9	.....	2.00	.....	19	.....	3.60	.....	29	5.6	2.40	.....
10	.....	2.40	.....	20	.....	5.90	.....	30	5.6	2.20	.....
								31	.....	2.00	.....

Monthly discharge of Spangler ditch near Battle Creek, Sask., 1912–1917.

Month.	Discharge in second-feet.			Total discharge in acre-feet.
	Maximum.	Minimum.	Mean.	
1912.				
June 4–18, 25–30	3.16	1.88	2.45	101
July	2.84	.60	2.04	125
August 1–3	.60	.60	.60	4
The period	.....	.....	.....	230
1913.				
May 23–31	2.10	.50	1.62	29
June 1–24	2.24	.12	1.38	66
July 6–19	.48	.16	.228	6
The period	.....	.....	.....	101
1914.				
May 4–9, 21–31	2.30	.00	1.28	43
June 1–12, 22–30	5.00	.30	2.50	105
July 1–4	.54	.15	.32	2
The period	.....	.....	.....	150
1915.				
May 10–13	1.70	1.45	1.68	13
June	.00	.00	.00	0
July 5–8, 23–31	4.80	1.91	3.40	87
August 1–3	.64	.23	.42	3
The period	.....	.....	.....	103
1917.				
June 24–30	5.8	2.60	4.8	67
July	5.9	1.04	3.6	221
August 1–4	2.9	2.20	2.5	20
The period	.....	.....	.....	308

Water used through J. M. Spangler ditch near Battle Creek, Sask., 1911–1917.

Year.	Acre-feet.	Time used.		Maximum discharge.
		From—	Till—	
				Sec.-ft.
1911	.....	.....	.....	.....
1912	236	June 4	Aug. 3	3.16
1913	101	May 23	June 24	2.24
		July 6	July 19	
1914	150	May 4	[a]July 4	5.00
1915	103	May 10	[a]Aug. 3	4.80
1916	.....	.....	.....	.....
1917	.....	June 24	Aug. 4	.....
Yearly average	148	.....	.....	.....

HENRY DITCH FROM HALFWAY COULEE, SASK.

LOCATION.—In NW. ¼ sec. 34, T. 5, R. 28 W. third meridian, about 300 feet below intake of ditch.

RECORDS AVAILABLE.—Complete records for 1915 and 1916. No water used in 1917.

GAGE.—Vertical staff; read by F. W. Henry.

DISCHARGE MEASUREMENTS.—Made with a 24-inch rectangular weir permanently set in ditch 10 feet below gage.

CHANNEL AND CONTROL.—Bed of ditch, gravel; control, weir in ditch.

ACCURACY.—Discharge measured over weir.

The following discharge measurement was made by H. W. Rowley:

April 27, 1916: Gage height, 1.27 feet; discharge, determined by means of 24-inch weir, 0.21 second-foot.

Station was visited March 25, June 30, August 11, August 31, and September 26, by Canadian engineers, who reported discharge as "nil."

Daily discharge in second-feet, of Henry ditch from Halfway Coulee, Sask., 1916.

Day.	April.	May.	Day.	April.	May.	Day.	April.	May.
1		0.21	11			21	0.50	
2		.18	12			22	.46	
3		.18	13			23	.31	
4		.15	14			24	.31	
5		.15	15			25	.15	
6		.15	16			26	.15	
7			17			27	.21	
8			18			28	.21	
9			19	0.72		29	.15	
10			20	.50		30	.15	
						31		

Monthly discharge of Henry ditch from Halfway Coulee, Sask., 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
April 19–30	0.72	0.15	0.30	7
May 1–6	.21	.15	.17	2
The period				9

STRONG DITCH NEAR EASTEND, SASK.

LOCATION.—In NE. ¼ sec. 25, T. 6, R. 22 W. third meridian, about half a mile below intake of ditch, on Frenchman River. Previous to April 17, 1911, the gage was at a bridge in sec. 36, T. 6, R. 22 W. third meridian, half a mile down the ditch from the present site.

RECORDS AVAILABLE.—Complete records 1909–1915; incomplete records for 1916; complete records for 1917.

GAGE.—Vertical staff at lower section used 1909–10; vertical staff at upper section used since 1911; read by J. C. Strong.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed of ditch, clay and permanent. Control affected by weeds during 1911 to 1917 and beaver dams in 1916 and 1917.

REGULATION.—Flow in ditch controlled by head gates at storage reservoir on Frenchman River.

ACCURACY.—Stage-discharge relation not permanent. Gage read intermittently. Records poor.

As the gage-height observations in 1911 are unreliable, the determinations of daily discharge for this year are only roughly approximate.

Discharge measurements of Strong ditch near Eastend, Sask., 1908–1917.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1908.		*Feet.*	*Sec.-ft.*	1911.		*Feet.*	*Sec.-ft.*
July 13	F. T. Fletcher	1.26	11.4	Aug. 3	G. H. Whyte	1.16	4.79
30	do	.95	2.5	31	do	.91	6.60
31	do	.70	2.0	Oct. 14	do	.....	0
1909.				1912.			
May 19	H. R. Carscallen	1.63	14.6	July 2	J. S. Wright	1.43	17.94
June 8	do	1.34	8.2	27	do	1.16	11.95
26	do	1.61	2.5	Aug. 26	do	.78	4.78
July 13	do	1.77	3.2	1913.			
31	do	2.04	6.7	June 9	E. W. W. Hughes	1.36	15.62
Aug. 23	do	1.43	5.6	1914.			
Sept. 21	do	.99	1.4	May 2	F. R. Steinberger	1.00	7.00
1910.				22	do	1.61	19.60
Apr. 18	H. R. Carscallen	.....	0	June 22	do	1.64	12.60
May 11	do	.91	1.19	July 16	do	.60	.82
31	do	1.52	16.20	1915.			
June 17	R. G. Swan	2.64	12.18	May 10	J. E. Caughey	1.73	16.50
July 15	do	.74	1.61	June 14	do	1.55	10.90
Aug. 3	R. J. Burley	2.15	4.60	July 8	do	1.35	5.70
4	R. G. Swann	2.29	5.42	Aug. 2	do	1.17	3.05
6	R. J. Burley	2.05	6.93	23	do	1.22	3.04
10	do	1.93	7.93	Sept. 9	G. H. Whyte	.....	0
16	do	1.75	5.73	1916.			
26	R. G. Swan	.45	1.89	May 14	J. E. Caughey	.85	2.8
Sept. 16	do	2.16	8.42	June 13	do	1.32	9.7
Oct. 12	do	1.92	11.85	July 7	do	1.55	9.9
1911.				20	do	1.65	2.7
Apr. 17	G. H. Whyte	.....	0	Sept. 29	L. B. P. Miles	Dry.	0
May 15	do	1.29	12.60	1917.			
June 5	do	1.16	10.20	June 6	M. H. French	1.45	5.6
12	do	1.49	20.93	July 14	do	2.01	12.6
July 5	do	.95	3.95				
10	do	.70	2.92				
27	do	.92	4.14				

Daily discharge, in second-feet, of Strong ditch near Eastend, Sask., 1909–1916.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Day.	May.	June.	July.	Aug.	Sept.	Oct.
1909.							1909.						
1	.....	9.35	1.75	6.1	8.25	0.6	16	11.5	16.4	2.45	3.55	2.1	0.1
2	.....	11.5	3.1	7.7	8.25		17	16.4	11.5	2.85	4.65	3.0	.1
3	.....	9.35	2.0	7.7	6.6	.6	18	13.85	9.35	2.85	4.65	3.0	0
4	.....	9.35	3.1	6.1	6.6	.6	19	13.85	11.5	4.65	3.55	2.1	0
5	.....	9.35	2.5	7.7	8.25	.6	20	9.35	11.5	2.45	2.85	2.1	0
6	.....	9.35	4.8	6.1	8.25	.4	21	11.5	15.2	3.55	2.45	1.4	0
7	.....	9.35	7.7	4.65	6.6	.6	22	7.5	11.3	2.45	2.45	1.4	0
8	.....	9.35	7.7	6.1	8.25	1.4	23	11.5	7.7	3.55	5.20	1.4	0
9	16.4	7.5	6.1	7.7	8.25	1.4	24	13.85	4.65	4.65	8.25	1.4	0
10	7.5	9.35	6.1	9.45	6.6	1.4	25	16.4	3.55	2.45	5.20	1.4	0
11	11.5	9.35	6.1	6.1	6.6	1.4	26	11.5	2.45	7.7	6.6	0.6	0
12	4.8	7.5	3.55	6.1	6.6	1.4	27	13.85	2.1	9.45	8.25	0.6	0
13	7.5	7.5	3.55	6.1	6.6	.1	28	13.85	2.45	6.1	8.25	0.6	0
14	11.5	7.5	6.1	4.65	6.6	.1	29	11.5	2.85	7.7	6.6	0.6	0
15	11.5	11.5	3.55	4.65	2.1	.1	30	16.4	2.1	7.7	14.9	0.6	0
							31	16.4	.....	6.1	12.4	.....	0

Daily discharge, in second-feet, of Strong ditch near Eastend, Sask., 1909–1916—Contd.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1910.							
1	.....	0.0	17.8	2.70	3.9	0.7	8.1
2	.....	0	17.8	1.90	3.9	2.2	8.1
3	.....	0	17.8	.70	3.9	2.2	8.1
4	.....	0	16.9	.70	5.4	2.2	8.1
5	.....	0	16.9	1.20	5.4	2.2	8.1
6	.....	0	15.9	1.50	6.9	2.4	8.1
7	.....	0	15.0	1.60	6.3	2.4	8.1
8	.....	0	15.0	1.35	7.4	2.6	7.8
9	.....	.1	15.0	.85	7.4	2.6	7.8
10	.....	.1	15.0	.85	7.4	7.8	6.3
11	.....	1.15	14.1	.40	7.4	7.8	6.3
12	.....	1.15	14.1	.40	7.4	7.9	11.8
13	.....	1.15	14.1	.40	7.2	8.0	11.8
14	.....	10.8	14.1	.85	7.2	8.6	11.8
15	.....	10.8	14.1	1.60	5.5	8.6	11.4
16	.....	10.8	14.1	.30	5.5	8.4	11.4
17	.....	10.8	11.5	.30	5.2	8.4	11.4
18	.....	10.8	11.5	.30	5.2	8.6	11.4
19	.....	10.8	10.7	.70	5.2	5.7	11.4
20	.....	10.8	10.7	.70	4.9	5.7	11.4
21	.....	13.3	7.1	1.75	4.9	6.9	11.4
22	.....	13.3	6.8	1.75	5.2	7.2	11.4
23	0.65	13.3	6.8	1.75	5.2	7.2	11.4
24	.65	15.9	6.8	2.50	3.1	8.0	10.6
25	.65	16.9	4.7	5.55	3.1	8.0	10.6
26	0	16.9	3.6	5.55	1.9	8.3	10.6
27	0	15.9	3.1	6.80	1.9	8.9	10.6
28	0	15.9	2.7	2.50	1.3	8.9	10.6
29	0	15.9	2.7	2.50	.5	8.9	8.4
30	0	15.9	2.7	3.90	.5	8.9	8.4
31	.....	15.9	.....	3.90	.7	.....	8.4

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1911.							1911.						
1	.....	.....	6.6	6.6	3.8	6.4	16	.....	6.6	6.6	6.1	2.4	.....
2	.....	.....	6.6	6.6	3.4	7.2	17	.....	6.6	6.6	6.4	5.1	.....
3	.....	.....	6.6	6.6	4.8	6.7	18	.....	6.6	6.6	6.2	5.7	.....
4	.....	.....	6.6	5.1	3.3	8.2	19	.....	6.6	6.6	6.3	5.6	.....
5	.....	.....	9.6	5.8	3.5	3.8	20	.....	6.6	6.6	6.1	6.1	.....
6	.....	.....	6.6	5.1	3.7	4.0	21	.....	6.6	6.6	6.0	6.1	.....
7	.....	.....	6.6	5.1	4.0	2.1	22	2.9	6.6	6.6	5.9	6.6	.....
8	.....	.....	6.6	5.2	4.1	.....	23	2.1	6.6	6.6	5.5	6.7	.....
9	.....	.....	6.6	5.1	6.5	.....	24	2.1	6.6	6.6	6.0	6.9	.....
10	.....	3.9	1.5	2.9	6.7	.....	25	2.1	6.6	6.6	5.7	6.8	.....
11	.....	5.1	.4	5.0	7.7	.....	26	2.1	6.6	6.6	5.5	7.4	.....
12	.....	5.1	21.0	4.9	7.2	.....	27	2.1	6.6	6.6	4.1	7.3	.....
13	.....	6.6	5.1	4.9	7.9	.....	28	.....	6.6	6.6	5.1	7.5	.....
14	.....	6.6	6.6	4.8	4.7	.....	29	.....	6.6	6.6	4.9	8.1	.....
15	.....	13.2	6.6	6.1	3.7	.....	30	.....	6.6	6.6	4.6	8.7	.....
							31	.....	6.6	.....	4.0	6.6	.....

Day.	June.	July.	Aug.	Sept.	Day.	June.	July.	Aug.	Sept.
1912.					1912.				
1	.....	16.06	20.00	4.29	16	.....	24.20	15.02	.....
2	.....	17.94	20.30	4.29	17	.....	23.90	14.50	.....
3	.....	23.30	20.00	4.07	18	.....	23.90	13.98	.....
4	.....	24.80	20.00	3.85	19	.....	23.60	12.00	.....
5	.....	24.80	19.40	3.65	20	0	23.60	9.90	.....
6	.....	24.50	19.10	3.55	21	0	23.90	9.50	.....
7	.....	24.50	18.80	.....	22	7.32	24.20	8.00	.....
8	.....	24.20	18.22	.....	23	8.36	23.60	5.00	.....
9	.....	24.20	17.66	.....	24	8.72	23.30	5.00	.....
10	.....	24.50	17.16	.....	25	8.90	23.60	5.00	.....
11	.....	24.20	16.58	.....	26	9.00	23.90	4.76	.....
12	.....	23.60	16.32	.....	27	11.12	23.60	5.00	.....
13	.....	23.90	16.06	.....	28	13.46	23.60	5.00	.....
14	.....	24.20	16.06	.....	29	13.46	23.30	5.00	.....
15	.....	24.20	15.54	.....	30	13.46	23.00	5.00	.....
					31	.....	22.70	4.52	.....

Daily discharge, in second-feet, of Strong ditch near Eastend, Sask., 1909–1916—Contd.

Day.	May.	June.	Day.	May.	June.	Day.	May.	June.
1913.			1913.			1913.		
1		8.90	11			21	0	
2		8.90	12			22	8.00	
3		8.90	13			23	8.36	
4		8.90	14			24	8.36	
5		9.10	15			25	8.36	
6		a 10.50	16			26	8.36	
7		a 12.24	17			27	8.36	
8		a 14.24	18			28	8.54	
9		a 16.06	19			29	8.90	
10			20	0		30	8.90	
						31	8.90	

Day.	May.	June.	July.	Day.	May.	June.	July.	Day.	May.	June.	July.
1914.				1914.				1914.			
1		15.8	15.60	11	a 19.2	13.5	4.00	21	a 19.2	9.1	0
2	7.0	17.8	15.60	12	a 19.2	13.2	3.00	22	19.6	12.7	0
3	a 12.6	13.2	13.80	13	a 19.2	13.0	2.10	23	19.2	7.6	0
4	a 17.0	15.0	13.80	14	a 19.2	10.7	1.40	24	18.1	9.0	0.10
5	a 19.2	14.8	13.80	15	a 19.2	10.5	.85	25	17.9	10.4	0
6	a 19.2	14.6	12.00	16	a 19.2	12.2	.85	26	17.3	9.0	0
7	a 19.2	16.5	9.00	17	a 19.2	12.0	.44	27	19.3	10.4	0.16
8	a 19.2	14.1	7.60	18	a 19.2	9.8	.31	28	16.7	10.4	0
9	a 19.2	11.8	5.00	19	a 19.2	11.5	0	29	18.9	12.0	0
10	a 19.2	13.7	4.00	20	a 19.2	9.3	0	30	16.3	12.0	0
								31	18.3	.....	0

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1915.							1915.						
1	.....	0.00	18.5	16.30	1.80	0.20	16	.....	15.00	10.7	19.20	1.72	.....
2	.....	4.65	17.4	17.40	2.00	.50	17	.....	14.00	11.2	20.00	1.16	.....
3	.....	1.00	18.8	17.40	1.40	.50	18	.....	12.40	11.8	23.00	1.32	.....
4	.....	6.90	13.7	16.70	1.40	.60	19	.....	14.30	12.7	23.00	1.00	.....
5	.....	7.20	12.1	17.00	1.40	.75	20	.....	15.60	14.0	25.00	1.00	.....
6	.....	12.10	11.5	18.50	1.24	1.00	21	.....	15.30	13.7	27.00	1.00	.....
7	.....	12.40	14.0	17.40	1.48	1.40	22	0.00	15.00	13.4	25.00	3.00	.....
8	.....	15.00	11.2	6.50	1.64	b 0	23	.06	12.40	13.7	25.00	3.30	.....
9	.....	16.70	11.2	5.80	1.00	.....	24	.16	14.00	12.4	24.00	3.70	.....
10	.....	15.60	10.7	6.00	1.32	.....	25	.29	17.40	14.0	17.40	3.30	.....
11	.....	15.60	10.7	1.48	1.40	.....	26	.29	19.20	13.7	15.60	4.70	.....
12	.....	15.60	10.1	3.70	1.40	.....	27	.32	19.60	13.7	14.00	5.40	.....
13	.....	16.30	10.1	10.10	1.32	.....	28	.60	21.00	15.3	9.50	2.90	.....
14	.....	19.20	11.0	10.40	1.16	.....	29	.10	23.00	16.3	4.70	2.30	.....
15	.....	17.40	10.7	17.40	1.64	.....	30	.08	21.00	16.3	3.80	1.80	.....
							31	.....	19.20	.....	1.60	.50	.....

Day.	June.	July.	Aug.	Day.	June.	July.	Aug.	Day.	June.	July.	Aug.
1916.				1916.				1916.			
1	11.5	5.1	2.70	11	9.6	8.1	6.70	21	6.1	2.1	8.70
2	11.3	6.0	6.40	12	9.3	7.4	7.60	22	5.9	2.7	6.60
3	11.1	5.8	4.30	13	9.1	5.5	7.60	23	5.6	2.7	4.70
4	10.9	5.6	3.60	14	8.9	4.9	8.40	24	5.4	2.7	9.00
5	10.7	6.5	1.70	15	8.7	4.2	8.40	25	5.3	2.7	10.40
6	10.5	6.3	1.25	16	8.4	4.5	11.20	26	5.1	2.7	11.60
7	10.3	6.1	.40	17	8.2	3.9	9.50	27	4.9	2.7	11.80
8	10.2	5.5	1.20	18	6.7	3.3	9.80	28	4.7	2.7	11.80
9	10.0	8.3	4.50	19	6.5	2.7	9.20	29	4.5	2.7	8.70
10	9.8	8.9	6.40	20	6.3	2.1	9.50	30	4.3	a 2.7	4.30
								31	.....	2.7	.35

a Estimated.

b Beaver dams disturbed gage readings.

NOTE.—1913: Gage not read after June 9.
1916: Discharge affected by beaver dams from July 20 to end of season. No flow after Aug. 31.

Monthly discharge of Strong ditch near Eastend, Sask., 1909–1917.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1909.				
May 9–31	16.40	4.80	12.17	553
June	11.50	2.10	8.39	499
July	9.45	1.75	4.66	287
August	14.90	2.45	6.35	390
September	8.25	.60	4.22	251
October 1–17	.60	.10	.68	22
The period				2,002
1910.				
April 23–30	0.65	0	0.244	4
May	16.90	0	8.011	513
June	17.80	2.70	11.303	672
July	6.80	.30	1.863	115
August	7.40	.50	4.739	291
September	8.90	.70	6.207	369
October	11.80	6.30	9.713	597
The period				2,561
1911.				
April 22–27	2.9	2.1	2.23	26
May 20–31	13.2	3.9	6.64	290
June	21.0	.4	6.75	402
July	6.6	2.9	5.44	334
August	8.7	2.4	5.76	354
September 1–7	8.2	2.1	5.49	76
The period				1,482
1912.				
June 20–30	13.46	0	8.53	186
July	24.80	16.06	23.44	1,441
August	20.30	4.52	12.85	790
September 1–6	4.29	3.55	3.95	47
The period				2,464
1913.				
May 20–31	8.90	8.00	7.09	169
June 1–9	16.06	8.90	10.86	194
The period				363
1914.				
May 2–31	19.2	7.00	18.2	1,083
June	17.8	7.60	12.2	726
July	15.6	0	4.0	245
The period				2,054
1915.				
April 22–30	5.10	.06	.77	14
May	23.00	.65	14.00	861
June	18.80	10.10	13.00	774
July	27.00	1.48	15.00	922
August	5.40	.50	1.94	119
September 1–8	1.40	.20	.63	10
The period				2,700
1916.				
June	11.5	4.30	8.0	476
July	8.9	2.10	4.5	277
August	11.8	.35	6.7	412
The period				1,165
1917.				
May 26–31			9.5	113
June			9.5	565
July			9.5	584
August 1–16			3.6	114
The period				1,376

NOTE.—Records for 1912 and 1916 roughly approximate.

Water used through Strong ditch near Eastend, Sask., 1909–1917.

[Source of supply, Frenchman River.]

Year.	Acre-feet.	Time used.		Maximum discharge.
		From—	Till—	
				Sec.-ft.
1909	2,002	May 9	Oct. 31	16.4
1910	2,561	Apr. 23	Oct. 31	17.8
1911	1,482	Apr. 22	Sept. 7	21.0
1912	*a* 2,464	June 20	Sept. 6	25.0
1913	363	May 20	June 9	16.1
1914	2,054	May 2	July 31	19.2
1915	2,700	Apr. 22	Sept. 8	27.0
1916	*a* 1,165	June 1	Aug. 31	11.8
1917	*a* 1,383	May 25	Aug. 16	12.6
Yearly average	1,797	.....	.....	.....

a Roughly approximate.

MORRISON'S DITCH NEAR EASTEND, SASK.

LOCATION.—In SW. ¼ sec. 26, T. 6, R. 21 W. third meridian, about 3 miles downstream from Eastend, and about half a mile from intake of ditch, on Frenchman River.

RECORDS AVAILABLE.—Discharge measurements only for 1911; ditch dry in 1912; complete records for 1913–1915; no water used in 1916–17 on account of destruction of diversion dam.

GAGE.—Vertical staff; read by Morrison Bros.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed of ditch, clay, and slightly overgrown with weeds, which affect control.

ACCURACY.—Stage-discharge relation not permanent.

Discharge measurements of Morrison's ditch near Eastend, Sask., 1911–1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1911.		*Feet.*	*Sec.-ft.*	1914.		*Feet.*	*Sec.-ft.*
Aug. 3	G. H. Whyte	.....	2.74	June 22	F. R. Steinberger	1.67	16.10
22	F. T. Fletcher	0.71	2.639	July 14	do	.48	1.73
1913.				1915.			
June 12	E. W. W. Hughes	.50	2.3	May 10	J. E. Caughey	.25	2.03
July 12	do	1.33	7.0	June 14	do	.63	3.90
				July 9	do	.43	2.30
				30	do	.....	0

Daily discharge, in second-feet, of Morrison's ditch near Eastend, Sask., 1913–1915.

Day.	June.	July.	Aug.	Day.	June.	July.	Aug.	Day.	June.	July.	Aug.
1913.				1913.				1913.			
1	.....	.....	5.10	11	.....	7.0	3.7	21	8.0	6.6	2.2
2	.....	.....	5.1	12	2.2	7.0	3.7	22	*a* 8.0	6.6	2.2
3	.....	.....	*a* 4.9	13	2.7	8.0	3.2	23	8.0	6.6	*a* 2.00
4	.....	.....	4.7	14	4.1	8.0	3.2	24	8.0	6.6	1.79
5	.....	.....	4.7	15	5.6	8.0	3.2	25	8.0	6.6	1.79
6	.....	.....	4.7	16	6.4	8.0	3.7	26	8.0	6.1	1.32
7	.....	.....	4.1	17	6.1	8.0	3.7	27	.....	*a* 5.6	*a* 1.32
8	.....	.....	4.1	18	*a* 7.6	7.6	3.7	28	.....	5.1	1.32
9	.....	.....	4.1	19	9.0	7.0	*a* 3.0	29	.....	5.1	.....
10	.....	.....	*a* 3.9	20	*a* 8.5	7.0	2.7	30	.....	5.1	.....
								31	.....	5.1	.....

Daily discharge, in second-feet, of Morrison's ditch near Eastend, Sask., 1913–1915—Continued.

Day.	May.	June.	July.	Oct.	Day.	May.	June.	July.	Oct.
1914.					1914.				
1		a 2.70	a 6.8		16		13.30		a 3.8
2		2.40	6.3	5.4	17		12.00		3.8
3		a 3.30	5.4	5.4	18		a 8.90		3.8
4		a 4.40	3.8	a 5.4	19		6.30		a 3.8
5		5.40		5.4	20		4.60		a 3.8
6		4.60		5.4	21		a 9.50		3.8
7		a 4.00		5.4	22		16.30		3.8
8		a 3.50		a 5.4	23		13.30		3.8
9		a 3.00		5.4	24		12.00		a 3.8
10		a 2.40		5.4	25	4.60	10.60		a 3.8
11		a 2.20		5.4	26	4.60	10.60		3.8
12		1.80		a 4.9	27	4.60	8.40		a 3.8
13		6.30		4.6	28	a 3.50	8.40		a 3.8
14		a 9.50		4.6	29	1.80	8.40		3.8
15		13.30		a 4.6	30	1.80	7.30		3.8
					31	3.10			

Day.	May.	June.	Day.	May.	June.	Day.	May.	June.
1915.			1915.			1915.		
1		8.6	11			21	5.9	8.6
2		8.6	12	2.8		22	5.0	7.6
3		8.6	13	2.8	2.8	23	4.3	a 7.2
4			14	3.5	2.8	24	2.8	6.8
5			15	a 5.4	2.8	25	2.8	6.8
6			16	7.6	2.8	26	6.8	5.9
7			17	7.6	2.8	27	6.8	5.9
8			18	8.6	2.8	28	7.6	
9			19	8.6	7.6	29	7.6	
10			20	5.9	7.6	30	a 8.0	
						31	a 8.3	

a Interpolated.

NOTE.—1914: Head gates closed July 5 to Oct. 1.
1915: Head gates opened May 12; closed June 27.

Monthly discharge of Morrison's ditch near Eastend, Sask., 1913–1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1913.				
June 12–26	9.0	2.2	6.68	199
July 11–31	8.0	5.1	6.70	279
August 1–28	5.1	1.32	3.33	185
The period				663
1914.				
May 25–31	4.60	1.80	3.40	48
June	16.3	1.80	7.30	434
July 1–4	6.8	3.80	5.60	44
October 2–30	5.4	3.80	4.50	257
The period				783
1915.				
May 12–31	8.60	2.80	6.00	238
June 1–3, 13–27	8.60	2.80	5.90	211
The period				449

MAPLE CREEK CATTLE CO.'S DITCH NEAR OXARART, SASK.

LOCATION.—In NE. ¼ sec. 20, T. 6, R. 27 W. third meridian, about 600 feet below intake of ditch on Oxarart Creek.

RECORDS AVAILABLE.—Incomplete records for 1916; no flow 1917.

GAGE.—Vertical staff.

DISCHARGE MEASUREMENTS.—Made with 26-inch rectangular weir, set permanently in ditch 6 feet below gage.

CHANNEL AND CONTROL.—Bed of ditch, gravel; control, permanent weir.

ACCURACY.—Discharge computed directly by applying daily heads to weir-discharge tables.

This ditch was inspected and found dry June 27, July 20, August 12 and 31, September 27, and November 13, 1917; it is believed that very little if any water was used during that year.

Daily discharge, in second-feet, of Maple Creek Cattle Co.'s ditch near Oxarart, Sask., 1916.

Day.	June.	July.	Day.	June.	July.	Day.	June.	July.
1		0.39	11			21		
2		.36	12			22		
3		.39	13			23		
4		.52	14			24		
5		.47	15			25		
6		.39	16			26		
7		.31	17			27	[a]0.31	
8		.31	18			28	.31	
9			19			29	.31	
10			20			30	.39	

[a] Station established June 27, 1916.

NOTE.—Head gate closed from July 9 to end of season.

Monthly discharge of Maple Creek Cattle Co.'s ditch near Oxarart, Sask., 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
June 27–30	0.39	0.31	0.33	3
July 1–8	.52	.31	.39	6
The period				9

F. CROSS'S DITCH NEAR DORRELL, SASK.

LOCATION.—In NW. ¼ sec. 15, T. 7, R. 22 W. third meridian, about 130 feet from intake of ditch on North Branch of Frenchman River.

RECORDS AVAILABLE.—Irrigation seasons 1912–1917.

GAGE.—Vertical staff fastened to left side of flume, read by Frank Cross.

DISCHARGE MEASUREMENTS.—Made by wading at gage or by weir in ditch.

CHANNEL AND CONTROL.—Flume 2 feet 10 inches wide, 1 foot 9 inches deep.

ACCURACY.—Stage-discharge relation permanent. Records fair.

Discharge measurements of F. Cross's ditch near Dorrell, Sask., 1912–1917.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
1912.			
June 10	J. S. Wright	1.5	1.1
1914.			
May 19	F. R. Steinberger	1.48	*a* 1.23
June 17	do	1.39	*a* .52
1915.			
June 15	J. E. Caughey	1.48	.92
Aug. 3	do		0
1917.			
June 9	M. H. French	1.27	3.10
July 24	do		0

a Weir measurement.

Daily discharge, in second-feet, of F. Cross's ditch near Dorrell, Sask., 1912, 1914, 1915, and 1917.

Day.	June.	Day.	June.	Day.	June.
1912.		1912.		1912.	
1		11	1.17	21	0.975
2		12	1.17	22	.975
3	1.17	13	1.17	23	.975
4	1.17	14	.00	24	.975
5	1.17	15	.00	25	.975
6	1.17	16	.00	26	.975
7	1.17	17	.00	27	.975
8	1.17	18	.00	28	.975
9	1.17	19	.00	29	.975
10	1.17	20	.975	30	.975

Day.	May.	June.	Day.	May.	June.	Day.	May.	June.
1914.			1914.			1914.		
1		0.80	11		0.65	21	1.07	0.20
2		.78	12		.58	22	1.05	
3		.76	13		.57	23	1.03	
4		.80	14		.54	24	1.01	
5		.83	15		.61	25	.99	
6		.81	16	1.17	.54	26	1.03	
7		.78	17	1.17	.53	27	1.01	
8		.72	18	1.17	.53	28	.99	
9		.70	19	1.23	.40	29	.97	
10		.67	20	1.21	.40	30	.90	
						31	.88	

Day.	May.	June.	July.	Day.	May.	June.	July.	Day.	May.	June.	July.
1915.				1915.				1915.			
1		1.08	0.90	11				21			
2			.90	12				22			
3			.88	13				23			
4			.90	14		0.85		24	0.95	0.85	
5			.88	15		.90		25	.95	.85	
6			.88	16		.90		26	1.18	.95	
7			.88	17		.95		27	1.05	.88	
8				18		.90		28	.95	.88	
9				19		.90		29	.95	.85	
10				20				30		.85	
								31	.95		

Day.	June.	July.	Day.	June.	July.	Day.	June.	July.
1917.			1917.			1917.		
1		3.3	11	3.7	3.3	21	3.4	
2		3.3	12	3.7	3.2	22	3.4	
3		3.3	13	3.4	3.2	23	3.6	
4		3.4	14	3.4	3.2	24	3.7	
5		3.3	15	3.4	3.2	25	3.6	
6		3.3	16	3.4	3.0	26	3.4	
7	3.4	3.3	17	3.4	3.0	27	3.3	
8	3.4	3.3	18	3.4	3.0	28	3.3	
9	3.4	3.3	19	3.4	3.0	29	3.3	
10	3.4	3.3	20	3.4	3.0	30	3.3	

Monthly discharge of F. Cross's ditch near Dorrell, Sask., 1912–1917.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1912.				
June 3–30	1.17	0.975	1.08	47.0
1914.				
May 16–31	1.23	.88	1.06	33
June 1–21	.83	.20	.63	26
The period	.....	.....	.....	59
1915.				
May 24–29, 31	1.18	.95	1.00	14.00
June 1, 14–20, 24–30	.95	.85	.90	25.00
July 1–7	.90	.88	.89	12.00
The period	.....	.....	.....	51.00
1916.				
May 21–24	3.8	3.7	3.8	30
June 4–11, 14–30	3.9	3.0	3.6	179
July 1–2	3.3	3.0	3.2	13
The period	.....	.....	.....	222
1917.				
June 7–30	3.7	3.3	3.4	162
July 1–20	3.4	3.0	3.2	127
The period	.....	.....	.....	289

Daily gage height, in feet, of F. Cross's ditch near Dorrell, Sask., 1916.

Day.	May.	June.	July.	Day.	May.	June.	July.	Day.	May.	June.	July.
1	.....	.....	1.33	11	.....	1.50	.....	21	1.46	1.33	.....
2	.....	.....	1.25	12	.....	.....	.....	22	1.46	1.50	.....
3	.....	.....	.....	13	.....	.....	.....	23	1.50	1.54	.....
4	.....	1.42	.....	14	.....	1.42	.....	24	1.50	1.42	.....
5	.....	1.50	.....	15	.....	1.42	.....	25	.....	1.38	.....
6	.....	1.46	.....	16	.....	1.42	.....	26	.....	1.29	.....
7	.....	1.42	.....	17	.....	1.42	.....	27	.....	1.29	.....
8	.....	1.35	.....	18	.....	1.42	.....	28	.....	1.25	.....
9	.....	1.42	.....	19	.....	1.42	.....	29	.....	1.33	.....
10	.....	1.50	.....	20	.....	1.42	.....	30	.....	1.42	.....
								31	.....	.....	.....

NOTE.—A discharge measurement made June 8 showed 4.1 second-feet flow. No others taken during season; therefore unable to plot curve and compute daily discharge. Head gate opened May 21, closed May 24; opened June 4, closed June 11; opened June 14, closed July 2.

Water used through F. Cross's ditch near Dorrell, Sask., 1912–1917.

[Source of supply, North Branch of Frenchman River.]

Year.	Acre-feet.	Time used.		Maximum discharge.
		From—	Till—	
1912	47	June 3	June 30	1.17
1913	.....	.....	.....	.....
1914	59	May 16	June 21	1.23
1915	51	May 24	[a]July 7	1.18
1916	.....	May 21	[a]July 2	.....
1917	289	June 7	July 20	3.70
Yearly average	112	.....	.....	.....

[a] Water used intermittently.

BARROBY DITCH NEAR RAVENSCRAG, SASK.

LOCATION.—In the SE. ¼ sec. 33, T. 6, R. 23 W. third meridian, about 1,000 feet below intake of ditch on north branch of Frenchman River.

RECORDS AVAILABLE.—Two discharge measurements in 1914.

GAGE.—Vertical staff; zero maintained at 97.67 feet.

DISCHARGE MEASUREMENTS.—Made with a weir or current meter.

CHANNEL AND CONTROL.—Bed of ditch, clay; permanent.

ACCURACY.—No rating curve developed.

No water was used in 1917 because of destruction of diversion dam.

Discharge measurements of Barroby ditch near Ravenscrag, Sask., 1914.

[Made by F. R. Steinberger, engineer.]

Date.	Gage height.	Discharge.
	Feet	*Sec.-ft.*
June 27	2.02	1.84
July 20	.58	.53

A. M. CROSS'S DITCH NEAR EASTEND, SASK.

LOCATION.—In the SE. ¼ sec. 5, T. 8, R. 22 W. third meridian about 400 feet below intake on Calf Creek.

RECORDS AVAILABLE.—Complete records for 1914 and 1917. No water used 1915–16.

GAGE.—Vertical staff; read by A. M. Cross.

DISCHARGE MEASUREMENTS.—Made with current meter or weir.

CHANNEL AND CONTROL.—Bed of ditch composed of clay and gravel, which may scour because of heavy grade; control permanent, to date.

ACCURACY.—Stage-discharge relation permanent. Discharge computed by applying daily gage heights to rating table.

Discharge measurements of A. M. Cross's ditch near Eastend, Sask., 1914 and 1917.

Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*
June 20	F. R. Steinberger	1.46	1.87
Aug. 8	....do	1.40	1.03
27	E. W. W. Hughes	1.25	1.29
1917.			
June 8	M. H. French	.35	.58
July 21	....do	.61	1.14

Daily discharge, in second-feet, of A. M. Cross's ditch near Eastend, Sask., 1914 and 1917.

Day.	June.	July.	Aug.	Sept.	Day.	June.	July.	Aug.	Sept.
1914.					1914.				
1	2.00	1.88	1.19	1.74	16	.....	1.62	1.27	.....
2	2.00	1.86	1.06	1.74	17	.....	1.60	1.30	.....
3	2.50	1.84	1.05	1.74	18	.....	1.58	1.50	.....
4	2.50	1.82	1.01	1.74	19	.....	1.48	1.46	.....
5	2.20	1.80	1.03	1.74	20	1.87	1.46	1.50	.....
6	2.00	1.79	1.01	1.74	21	2.10	1.36	1.54	.....
7	2.10	1.77	.99	1.74	22	2.00	1.34	1.58	.....
8	2.00	1.75	1.03	1.87	23	1.98	1.32	1.62	.....
9	2.00	1.73	1.23	1.87	24	1.96	1.30	1.72	.....
10	2.00	1.72	1.17	1.74	25	1.94	1.28	1.75	.....
11	2.00	1.70	1.14	1.74	26	2.20	1.26	1.70	.....
12	2.20	1.68	1.16	2.00	27	2.10	1.24	1.74	.....
13	2.20	1.67	1.26	2.20	28	2.00	1.14	1.74	.....
14	.....	1.66	1.28	.....	29	1.92	1.13	1.74	.....
15	.....	1.64	1.24	.....	30	1.78	1.11	1.74	.....
					31	.....	1.21	1.87	.....

NOTE.—1914: Shifting control June 20 to Aug. 27.

Daily discharge, in second-feet, of A. M. Cross's ditch near Eastend, Sask., 1914 and 1917—Continued.

Day.	June.	July.	Day.	June.	July.	Day.	June.	July.
1917.			1917.			1917.		
1		0.98	11		0.98	21	0.93	0.95
2		.98	12		.98	22	1.02	.95
3		1.11	13		.98	23	1.02	.95
4		1.02	14		.98	24	.84	.95
5		.98	15		.98	25	1.02	.95
6		.98	16		.98	26	1.02	.95
7		.98	17		.98	27	1.02	.95
8		.98	18		.98	28	1.02	.95
9		.98	19	0.93	.98	29	1.02	
10		.98	20	.93	.98	30	1.02	
						31		

Monthly discharge of A. M. Cross's ditch near Eastend, Sask., 1914 and 1917.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1914.				
June	2.50	1.87	2.10	99
July	1.88	1.11	1.54	95
August	1.87	.99	1.38	85
September 1–13	2.20	1.74	1.81	47
The period				326
1917.				
June 19–30	1.02	.84	.98	23
July 1–28	1.11	.95	.98	54
The period				77

Water used through A. M. Cross's ditch near Eastend, Sask., 1914–1917.

[Source of supply, Calf Creek.]

Year.	Acre-feet.	Time used.		Maximum discharge.
		From—	Till—	
1914	326	June 1	Sept. 13	2.50
1915				
1916				
1917	77			a 1.14
Yearly average	202			

a Discharge measurement.

BOLINGBROKE DITCH NEAR EASTEND, SASK.

LOCATION.—In NE. ¼ sec. 7, T. 7, R. 22 W. third meridian, about 10 miles northwest of Eastend, diverting water from a spring creek tributary to the north branch of Frenchman River.

RECORDS AVAILABLE.—Irrigation season 1914.

GAGE.—Vertical staff.

DISCHARGE MEASUREMENTS.—Made with a weir near station.

CHANNEL AND CONTROL.—Bed of ditch clay; permanent.

ACCURACY.—No rating curve developed.

The following discharge measurement was made by F. R. Steinberger:

June 26, 1914: Gage height, 0.42 foot; discharge, 0.15 second-foot.

Daily discharge, in second-feet, of Bolingbroke ditch near Eastend, Sask., 1914.

Day.	May.	June.	Day.	May.	June.	Day.	May.	June.
1		0.03	11		.06	21		
2		.03	12		.07	22		
3		.03	13		.16	23		
4		.06	14			24		
5		.06	15			25		
6		.06	16			26		
7		.05	17			27	0.02	
8		.03	18			28	.02	
9		.03	19			29	.02	
10		.03	20			30	.02	
						31	.02	

Monthly discharge of Bolingbroke ditch near Eastend, Sask., 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
May 27–31	0.02	0.02	0.02	0.2
June 1–13	.16	.03	.05	1.4
The period				1.6

BOWREY DITCH NEAR BARNARD, MONT.

LOCATION.—In SE. ¼ sec. 1, T. 37 N., R. 37 E. Montana, principal meridian near Barnard, Mont., half a mile south of international boundary.

RECORDS AVAILABLE.—Irrigation seasons; incomplete records April 30 to August 26, 1914; no water used 1916–17.

GAGE.—Vertical staff read by C. W. Bowrey.

DISCHARGE MEASUREMENTS.—Made by wading or with weir.

CHANNEL AND CONTROL.—Banks high; overflow unlikely. Bed sandy and clean. Channel permanent, but subject to washout if large amount of water is turned into ditch.

ACCURACY.—Stage-discharge relation practically permanent. Records obtained in 1914 were fair, as discharge measurements were taken between gage heights 0.70 and 1.45 feet. Gage read daily to hundredths. Ditch not used for irrigation since 1914, when dam went out.

Discharge measurements of Bowrey ditch near Barnard, Mont., 1914.

[Made by E. W. W. Hughes, hydrographer.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
April 30		0
June 30	0.70	0.53
July 1	1.45	1.05

Monthly discharge of Bowrey ditch near Barnard, Mont., 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
June 1–8, 30	1.09	0	0.98	18
July 1–2	1.09	0	1.08	4
August 25–26	1.23	0	1.06	4
The period				26

ROCK CREEK CANAL NEAR HINSDALE, MONT.

LOCATION.—Near the center of sec. 3, T. 31 N., R. 36 E., about 300 feet below head gates on Rock Creek, 7 miles north of Hinsdale, in Valley County.

RECORDS AVAILABLE.—July 1, 1905, to September 10, 1907.

GAGE.—Staff gage graduated to tenths and driven into bed of canal near left bank 300 feet below head gates.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed of canal composed of mud. A check gate about a mile below the gage might affect the stage-discharge relation.

REGULATION.—Discharge regulated by head gates.

ACCURACY.—Stage-discharge relation not permanent. Daily discharge for 1906 and 1907 not computed because of insufficient data. Records poor.

Discharge measurements of Rock Creek canal near Hinsdale, Mont., 1905–1907.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1905.		*Feet.*	*Sec.-ft.*	1906.		*Feet.*	*Sec.-ft.*
July 5	C. T. Prall	1.0	30.7	Aug. 14	W. B. Freeman	−0.45	[a] 1.0
24	W. B. Freeman	.19	2.5				
Aug. 12	do	.3	6.7	1907.			
				July 31	J. B. Pierson	2.00	3.1
1906.				Aug. 28	do	1.80	2.8
July 9	W. S. Hartman	.20	13.1	Oct. 21	do	.....	[a] 1.5
22	W. B. Freeman	− .10	[a] 8.0				

[a] Estimated.

Daily gage height, in feet, of Rock Creek canal near Hinsdale, Mont., 1906–1907.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1906.							1906.						
1	.....	0.1	0.75	0.0	−0.3	−0.3	17	0.8	0.5	2.3	0.1	−0.3	−0.3
2	.....	.1	.6	.0	− .3	− .3	18	.7	.4	2.1	.1	− .3	− .3
3	.....	.1	.6	.0	− .3	− .3	19	.5	.2	2.0	.1	− .3	− .3
4	.....	.1	.7	.0	− .3	− .3	20	.5	.1	1.8	.1	− .3	− .3
5	.....	.1	1.0	.0	− .3	− .3	21	.4	.1	1.6	.0	− .3	− .3
6	.....	.05	1.0	.0	− .3	− .3	22	.4	.1	1.1	− .1	− .3	− .3
7	1.2	.05	2.4	.0	− .3	− .3	23	.3	.1	.5	.0	− .3	− .3
8	.8	.05	.....	.0	− .3	− .3	24	.3	.1	.0	.0	− .3	− .3
9	.6	.05	.....	.5	− .3	− .3	25	.2	1.95	.0	− .1	− .3	− .3
10	.1	.05	5.1	.4	− .3	− .3	26	.2	1.8	.0	− .1	− .3	− .3
11	.3	.05	.....	.3	− .3	− .3	27	.2	1.3	.0	− .2	− .3	− .3
12	.5	.05	.....	.2	− .3	− .3	28	.1	1.2	.0	− .2	− .3	− .3
13	.9	.05	6.9	.2	− .3	− .3	29	.1	1.2	.0	− .2	− .3	− .3
14	.9	.05	4.8	.2	− .3	− .3	30	.1	1.4	.0	− .3	− .3	− .3
15	.7	.1	2.6	.2	− .3	− .3	31	.....	1.3	.....	− .3	− .3	.....
16	.6	.4	2.5	.2	− .3	− .3							

Day.	Aug.	Sept.	Day.	Aug.	Sept.	Day.	Aug.	Sept.
1907.			1907.			1907.		
1	.....	3.1	11	1.8	.....	21	1.8	.....
2	1.9	2.9	12	1.8	.....	22	1.8	.....
3	1.9	2.9	13	1.8	.....	23	1.8	.....
4	1.9	2.9	14	1.9	.....	24	1.8	.....
5	1.8	2.9	15	1.9	.....	25	1.8	.....
6	1.8	2.9	16	1.9	.....	26	1.8	.....
7	1.8	2.9	17	1.9	.....	27	1.8	.....
8	1.8	2.9	18	1.8	.....	28	1.8	.....
9	1.8	2.8	19	1.8	.....	29	1.8	.....
10	1.8	2.7	20	1.8	.....	30	1.8	.....
						31	2.6	.....

NOTE.—Daily discharge for 1906 and 1907 was not computed because of insufficient data. Some idea of the flow can be obtained from the gage heights and discharge measurements, although canal regulation below the gage caused unknown changes in the stage-discharge relation. June 8–9 and 11–12, 1906, the water was above the gage with a maximum gage height of 11 feet. After Aug. 30, 1907, the stage-discharge relation was affected by canal regulation.

Daily discharge, in second-feet, of Rock Creek canal near Hinsdale, Mont., 1905.

Day.	July.	Aug.	Day.	July.	Aug.	Day.	July.	Aug.
1	31	41	11	17	7	21	6	.....
2	31	29	12	16	6	22	5	.....
3	31	27	13	12	5	23	5	.....
4	31	23	14	9	3	24	3	.....
5	31	19	15	9	2	25	1	.....
6	29	17	16	11	1	26	48	.....
7	31	15	17	18	.....	27	48	.....
8	29	12	18	12	.....	28	41	.....
9	25	9	19	9	.....	29	44	.....
10	19	9	20	8	.....	30	44	.....
						31	39	.....

NOTE.—1905: No gage heights recorded previous to July 5, 1905, when station was established. Daily discharge estimated July 1–4. No flow beginning Aug. 16.
Mean flow for July, 1905, 22 second-feet (1,350 acre-feet). Mean flow for August, 1905, 7.3 second-feet (438 acre-feet).

FLOODS IN MILK RIVER BASIN.

The two greatest floods during the period of record on Milk River occurred in 1906 and 1912. The following table gives the estimated maximum discharge at several points on the main stream and also for the larger tributaries:

Maximum discharge, in second-feet, of streams in Milk River valley below Havre, floods of June, 1906, and April, 1912.

Station.	Locality.	Area of drainage basin.	Flood of June, 1906.	Flood of April, 1912.
		Sq. miles.	*Sec.-ft.*	*Sec.-ft.*
Milk River	Havre	4,850	4,000	[a] [b] 4,860
Do	Malta	10,700	11,250	[b] 9,320
Do	Hinsdale	17,300	.....	[c] 24,200
Area tributary to Milk River between Havre and Malta	.....	5,650	8,920	[b] 8,080
Area tributary to Milk River between Malta and Hinsdale	.....	6,600	.....	[b] 15,080
North Fork of Milk River	Chinook	1,432	[d] 7,700	[b] 4,000
Frenchman River	Saco	1,700	6,500	[b] 3,860
Beaver Creek	do	.....	6,650	[c] 1,810
Beaver Creek below mouth of Larb Creek	Hinsdale	.....	.....	[c] 4,630
Beaver Creek overflow	Bowdoin	.....	.....	[c] 3,040
Rock Creek	Hinsdale	976	6,220	[e] 10,000
Peoples Creek	Dodson	.....	[f] 4,500	[g] 1,700
Alkali Creek	Malta	.....	5,300	[g] 2,300
Whitewater Creek	Saco	.....	3,500	.....
Antelope Creek	Tampico	.....	2,300	[g] 1,410
Brazil Creek	Glasgow	.....	2,000	[g] 2,160
Cherry Creek	do	.....	1,240	[g] 1,460

[a] Mean for day, 4,280 second-feet.
[b] Estimate probably good.
[c] Estimate probably fair and within 15 per cent.
[d] Discharge at this rate lasted only a short time; mean for day, 4,600 second-feet.
[e] Computed from the high-water marks at the bridge 3 miles above mouth and at the station 5 miles above mouth. If the high water on Rock Creek and Milk River occurred simultaneously both places were affected by backwater and the result should be somewhat smaller. Discharge probably did not exceed amount given.
[f] Includes overflow.
[g] Estimate based on flood section and surface slope, using Kutter's formula; accuracy doubtful; results should be used only in connection with other data.

NOTE.—The estimates of maximum discharge for the flood of June, 1906, outside of the stations on Milk River at Havre and Malta, are based largely on flood cross sections and surface slope and should not be used except in connection with other data. The published maximum discharge for Rock Creek during the flood of 1906 has been reduced from 18,000 second-feet to 6,220 second-feet, based on the application of the maximum gage height to an extension of the rating curve.

MISCELLANEOUS MEASUREMENTS.

Measurements of discharge of streams and ditches in the Milk River basin at points other than those at which gaging stations are maintained are recorded in the following table:

Miscellaneous discharge measurements in Milk River drainage basin during 1900–1917.

Measurements made by United States engineers.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
1900.					
June 14	South Fork Milk River	Milk River	Paul's ranch, Blackfeet Reservation, Mont.		31
19	North Fork Milk River	do	Hall's ranch, Blackfeet Reservation, Mont.		12
21	Middle Fork Milk River.	do	Ford on road to Babb, Mont.		7
1903.					
May 25	Harlem canal	From Milk River	Zurich, Mont		36
July 15	Milk River	Missouri River	Near head of Alberta Railway & Irrigation Cos. Milk River canal, near Milk River, Alta., Canada.		62
Aug. 10	do	do	Havre, Mont		3.4
9	do	do	Below intake Fort Belknap canal, near Lohman, Mont.		2.9
9	do	do	Below intake Paradise canal, near Chinook, Mont.		3.0
8	do	do	Below intake Harlem canal, near Zurich, Mont.		2.3
8	do	do	Below intake Indian canal, near Harlem, Mont.		1.4
6	do	do	Malta, Mont		1.0
6	do	do	Glasgow, Mont		27.5
9	Fort Belknap canal	Diverts from Milk River.	Chinook, Mont		2.6
9	Lodge Creek	Milk River	do		2.0
9	Paradise canal	Diverts from Milk River.	do		5.3
8	Harlem canal	do	Zurich, Mont		1.0
8	Indian canal	do	Harlem, Mont		2.0
1904.					
Apr. 8	Exeter Creek	Milk River	Exeter, Mont		20
13	do	do	do		1
18	Alkali Creek	do	1 mile above mouth near Malta, Mont.		275
1905.					
June 16	Milk River [a]	Missouri River	Lohman, Mont		[b]1.0
July 1	do	do	do		[b].2
12	do	do	do		[b].2
20	do	do	do		[b].3
28	do	do	do		[b].5
29	do	do	do		[b]60
Aug. 3	do	do	do		[b]4.0
8	do	do	do		[b]1.0
15	do	do	do		[b].2
23	do	do	do		.0
June 17	Milk River [c]	do	Chinook, Mont		[b]3.0
24	do	do	do		[b]3.0
July 8	do	do	do		136
15	do	do	do		3.0
21	do	do	do		[b]7.0
Aug. 11	do	do	do		53
19	Milk River [c]	Missouri River	Chinook, Mont		[b]8.0
June 17	Milk River [d]	do	Zurich, Mont		[b]1.5
24	do	do	do		[b]2.0
July 8	do	do	do		180
15	do	do	do		[b]5.0
21	do	do	do		[b]4.0
Aug. 5	do	do	do		209
11	do	do	do		35
19	do	do	do		[b]6.0
July 14	Milk River [e]	do	Harlem, Mont		[b]1.0
28	do	do	do		409
Aug. 4	do	do	do		[b]50
17	do	do	do		[b]5.0

[a] Estimated just below the head of the Fort Belknap canal.
[b] Estimated.
[c] Measured just below the head of the Paradise Valley canal.
[d] Measured just below the head of the Harlem canal.
[e] Measured just below head of Agency ditch.

Miscellaneous discharge measurements in Milk River drainage basin during 1900–1917—Continued.

Measurements made by United States engineers

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
1905.					
Aug. 25	Milk River	Missouri River	Harlem, Mont		*a*1.0
Sept. 5	do	do	do		*a*2.0
25	Agency ditch *b*	From Milk River	Fort Belknap Agency, Mont		15.0
July 11	Lodge Creek *c*	Milk River	Chinook, Mont		*a*1.0
18	do	do	do		*a*7.0
Aug. 2	do	do	do		24.0
8	do	do	do		38.0
10	Lodge Creek *c*	Milk River	Chinook, Mont		20.0
11	do	do	do		*a*15.0
15	do	do	do		*a*.5
23	do	do	do		*a*.5
July 5	Rock Creek *d*	do	Hinsdale, Mont	2.0	14.0
24	do	do	do	1.58	*a*.5
Aug. 12	do	do	do	1.6	*a*.5
1906.					
Apr. 23	Milk River	Missouri River	Below Harlem canal, near Zurich, Mont.	1.32	46
May 5	do	do	do	1.58	60
23	do	do	do	1.41	30
July 19	do	do	Glasgow, Mont		430
31	Beaver Creek	Milk River	Fort Assinniboine, Mont		6.8
31	do	do	Pacific Junction, Mont		5.6
31	Havre Irrigation Co. canal.	From Beaver Creek	Fort Assinniboine, Mont		6.0
3	Clear Creek	Milk River	Yantic, Mont		67
June 29	Threemile Coulee	do	Chinook, Mont		4.7
July 20	Lodge Creek	do	1 mile below West Fork ditch at ford, near Chinook, Mont.	2.40	10
June 29	Sixmile Coulee	do	½ mile above mouth, near Chinook, Mont.		4.8
29	Fifteenmile Coulee	do	Zurich, Mont		8.8
July 6	Snake Creek	do	Harlem, Mont		5.8
27	Peoples Creek	do	Fort Belknap Indian Reservation, Mont.		6.0
27	Alkali Creek	do	5 miles west of Malta, Mont		1.0
25	Cottonwood Creek	Milk River	18 miles northeast of Malta, Mont.		5.0
25	Whitewater Creek	do	Upper reservoir, near Bowdoin, Mont.		4.0
12	Beaver Creek	do	Gravel crossing 10 miles south of Lake Bowdoin, Mont.		20
16	Larb Creek	Beaver Creek	Near Malta, Mont		2.0
24	Frenchman River	Milk River	Saco, Mont., 5 miles above mouth.		50
1910.					
Jan. 14	Milk River	Missouri River	Malta, Mont		*a*25
16	do	do	Exeter, Mont		*a*25
June 21	do	do	Chinook, Mont		33
July 9	do	do	do		35
1912.					
Aug. 25	South Fork Milk River	Missouri River	Mackey's ranch, near Kimball, Alta.		21
Apr. 10	Milk River	do	Vandalia, Mont		*e*20,900
May 6	Peoples Creek	Milk River	Near Dodson, Mont		688
24	do	do	do		292
June 17	do	do	do		214
17	Schultz and Ereaux canal.	From Peoples Creek	do		7.2
May 7	Alkali Creek	Milk River	Near Malta, Mont		584
Apr. 20	Frenchman River	do	Highway bridge, near mouth and near Saco, Mont.		3,520
7	Beaver Creek	do	Highway bridge, near mouth and near Hinsdale, Mont.		*f*1,290
2	Rock Creek	do	do		475
18	do	do	do		1,060
1915.					
May 8	Milk River	Missouri River	Below Fort Belknap dam near Lohman, Mont.		22.7
Apr. 28	Sage Creek	Big Sandy Creek	Highway bridge on section line running north 1 mile east of Rudyard, Mont.		*a*.1

a Estimated.
b Measured 1½ miles below head gate.
c Measured below all diversions.
d Measured just below head of Rock Creek canal.
e There was also an overflow section of 2,690 square feet with an average velocity of not over 2 feet per second.
f There was a large overflow section not included.

Miscellaneous discharge measurements in Milk River drainage basin during 1900–1917—Continued.

Measurements made by Canadian engineers.

Minor tributaries.

Date.	Stream.	Locality.				Hydrographer.	Discharge.
		Quarter.	Sec.	T.	R.[a]		
1910.							*Sec.-ft.*
Apr. 11	Bear Gulch Creek	.....	30	2	9	F. H. Peters	0.6
21	....do	.....	30	2	9	N. M. Sutherland	.2
29	....do	.....	30	2	9	....do	.25
May 17	....do	.....	30	2	9	....do	.15
22	....do	.....	30	2	9	....do	.0
Apr. 10	Creek	.....	34	1	13	F. H. Peters	.3
27	....do	SE.	27	1	21	L. J. Gleeson	3.0
May 11	....do	SE.	27	1	21	....do	1.44
19	....do	SE.	27	1	21	....do	3.0
25	....do	SE.	27	1	21	....do	2.55
June 8	....do	SE.	27	1	21	....do	5.0
Apr. 13	....do	SE.	24	1	23	....do	.66
13	....do	SE.	27	1	21	....do	6.0
14	....do	SW.	19	2	20	....do	11.25
14	....do	SW.	19	2	18	....do	5.0
21	....do	SW.	19	2	20	....do	5.4
May 12	....do	SW.	19	2	20	....do	1.65
Apr. 21	....do	SE.	24	1	23	....do	.25
May 11	....do	SE.	24	1	23	....do	.6
20	....do	SE.	24	1	23	....do	1.2
24	....do	SE.	24	1	23	....do	1.2
June 3	....do	SE.	24	1	23	....do	1.2
8	....do	SE.	24	1	23	....do	3.0
21	....do	SE.	24	1	23	....do	.75
Apr. 19	....do	SW.	19	2	18	....do	2.0
11	Deer Creek	.....	36	1	12	F. H. Peters	0
11	Deadhorse Creek	NW.	4	1	11	....do	.33
21	....do	NW.	4	1	11	N. M. Sutherland	.10
29	....do	NW.	4	1	11	....do	.12
May 17	....do	NW.	4	1	11	....do	.10
22	....do	NW.	4	1	11	....do	.12
27	....do	NW.	4	1	11	....do	.10
June 1	....do	NW.	4	1	11	....do	.10
17	....do	NW.	4	1	11	....do	.05
23	....do	NW.	4	1	11	....do	.08
Sept. 16	....do	NW.	4	1	11	G. H. Whyte	.02
29	....do	NW.	4	1	11	....do	.02
Oct. 5	....do	NW.	4	1	11	....do	.04
11	....do	NW.	4	1	11	....do	.03
15	....do	NW.	4	1	11	....do	.04
24	....do	NW.	4	1	11	....do	.02
29	....do	NW.	4	1	11	....do	.03
Nov. 7	....do	NW.	4	1	11	....do	.05
14	....do	NW.	4	1	11	....do	.10
Apr. 11	Halfbreed Creek	.....	28	2	10	F. H. Peters	.4
21	....do	.....	28	2	10	N. M. Sutherland	.25
29	....do	.....	28	2	10	....do	.15
May 12	....do	.....	28	2	10	F. H. Peters	.08
17	....do	.....	28	2	10	N. M. Sutherland	0
22	....do	.....	28	2	10	....do	0
Apr. 14	Kennedy Creek	.....	2	1	5	F. H. Peters	0
22	....do	.....	2	1	5	N. M. Sutherland	0
23	Lost River	.....	2	1	4	....do	0
May 13	....do	.....	2	1	4	....do	.08
14	....do	.....	2	1	4	F. H. Peters	0
Apr. 14	Lonely Valley River	.....	28	2	20	L. J. Gleeson	5.0
21	....do	.....	28	2	20	....do	2.0
28	....do	.....	28	2	20	....do	2.1
May 17	....do	.....	28	2	20	....do	2.0
26	....do	.....	28	2	20	....do	2.0
June 8	....do	.....	28	2	20	....do	.34
22	....do	.....	28	2	20	....do	1.0
Oct. 1	....do	.....	28	2	20	N. M. Sutherland	.1
Apr. 21	Miners Coulee	.....	10	2	11	....do	0
20	Police Creek	.....	34	1	13	....do	0
May 18	....do	.....	34	1	13	....do	1
4	Red Creek	.....	18	1	15	F. H. Peters	0
8	....do	.....	18	1	15	....do	0

[a] Range numbers are all west of the fourth meridian.

Miscellaneous discharge measurements in Milk River drainage basin during 1900–1917—Continued.

Measurements made by Canadian engineers—Continued.

Minor tributaries—Continued.

Date.	Stream.	Locality.				Hydrographer.	Discharge.
		Quarter.	Sec.	T.	R.[a]		
1911.							*Sec.-ft.*
Apr. 26	Bear Gulch Creek		19	2	9	N. M. Sutherland	0.53
May 5	do		19	2	9	do	.37
13	do		19	2	9	do	0
June 5	do		19	2	9	J. E. Degnan	1.01
July 22	do		20	2	9	do	0
Aug. 12	do		19	2	9	do	0
Oct. 26	do		19	2	9	do	2.38
May 3	Creek		24	1	23	L. J. Gleeson	.50
4	do		19	2	18	do	1.20
Apr. 18	Dead Horse Creek		4	2	11	do	.17
26	do		4	2	11	do	0
May 28	do		10	2	11	do	.02
July 22	do		4	2	11	do	0
Aug. 18	do		4	2	11	do	.20
Sept. 23	do		4	2	11	do	5.31
Oct. 26	do		4	2	11	do	1.89
Nov. 24	do		4	2	11	do	3.92
Apr. 18	Halfbreed Creek		28	2	10	N. M. Sutherland	2.22
26	do		28	2	10	do	1.39
May 5	do		28	2	10	do	1.37
13	do		28	2	10	do	1.01
28	do		28	2	10	J. E. Degnan	5.55
June 5	do		22	2	10	do	5.37
July 22	do		28	2	10	do	.82
Aug. 18	do		28	2	10	do	1.70
Sept. 23	do		21	2	10	do	14.4
Oct. 26	do		28	2	10	do	4.98
Nov. 4	do		28	2	10	do	8.71
May 31	Kennedy Creek		3	1	5	do	.07
June 20	do		3	1	5	do	1.59
July 14	do		3	1	5	do	0
Sept. 26	do		3	1	5	do	2.56
July 15	Lost River		2	1	4	do	0
22	Miners Coulee		10	2	11	do	0
Aug. 18	do		10	2	11	do	1.90
Sept 23	do		10	2	11	do	9.74
Oct. 3	do		10	2	11	do	36.40
26	do		10	2	11	do	2.44
Nov. 4	do		10	2	11	do	5.98
July 18	Pritchard Coulee		4	1	11	do	0
Apr. 17	Police Creek		35	1	13	N. M. Sutherland	.94
May 24	do		35	1	13	J. E. Degnan	.24
25	do		35	1	13	do	.480
July 7	do		35	1	13	do	1.810
Aug. 21	do		35	1	13	do	.331
Sept. 2	do		35	1	13	do	0
11	do		35	1	13	do	9.610
18	do		35	1	13	do	4.910
Oct. 4	do		35	1	13	do	9.000
23	do		35	1	13	do	2.070
July 29	Red Creek		13	1	15	do	0
Aug. 8	do		20	1	15	do	0
Nov. 5	Spring Creek		31	2	11	do	1.180
July 25	Verdigris Creek		11	2	14	do	0
Aug. 10	do		28	2	14	do	0
1912.							
Apr. 27	Bear Gulch Creek		19	2	9	do	7.80
May 28	do		19	2	9	do	3.59
June 28	do		19	2	9	do	0
July 18	do		19	2	9	do	0
25	do		19	2	9	do	0
Apr. 27	Dead Horse Coulee		4	2	11	do	.93
May 5	do		4	2	11	do	.85
22	do		4	2	11	do	.58
28	do		4	2	11	do	.14
June 11	do		4	2	11	do	0
28	do		4	2	11	do	0
July 18	do		4	2	11	do	0
25	do		4	2	11	do	0
Apr. 27	Halfbreed Creek		21	2	10	do	10.20

[a] Range numbers are all west of the fourth meridian.

Miscellaneous discharge measurements in Milk River drainage basin during 1900–1917—Continued.

Measurements made by Canadian engineers—Continued.

Minor tributaries—Continued.

Date.	Stream.	Locality.				Hydrographer.	Discharge.
		Quarter.	Sec.	T.	R.[a]		
1912.							*Sec.-ft.*
May 5	Halfbreed Creek	.....	21	2	10	J. E. Degnan	8.91
28	.....do	.....	21	2	10	.....do	11.18
June 11	.....do	.....	21	2	10	.....do	.12
19	.....do	.....	21	2	10	.....do	.67
28	.....do	.....	21	2	10	.....do	0
July 16	.....do	.....	21	2	10	.....do	0
25	.....do	.....	21	2	10	.....do	0
Nov. 14	.....do	.....	21	2	10	.....do	1.49
May 1	Kennedy Creek	.....	3	1	5	.....do	0
June 30	.....do	.....	3	1	5	.....do	0
July 21	.....do	.....	3	1	5	.....do	0
Aug. 8	.....do	.....	3	1	5	.....do	0
Apr. 27	Miners Coulee	.....	10	2	11	.....do	4.47
May 5	.....do	.....	10	2	11	.....do	3.40
22	.....do	.....	10	2	11	.....do	1.65
28	.....do	.....	10	2	11	.....do	2.59
June 11	.....do	.....	10	2	11	.....do	.102
28	.....do	.....	10	2	11	.....do	0
July 18	.....do	.....	10	2	11	.....do	0
25	.....do	.....	10	2	11	.....do	0
Nov. 14	.....do	.....	10	2	11	.....do	.99
Apr. 26	Police Coulee	.....	35	1	13	.....do	2.82
May 7	.....do	.....	35	1	13	.....do	1.86
19	.....do	.....	35	1	13	.....do	1.01
June 10	.....do	.....	35	1	13	.....do	.43
July 3	.....do	.....	35	1	13	.....do	0
Aug. 5	.....do	.....	35	1	13	.....do	0
May 30	Spring	.....	13	1	23	L. J. Gleason	.78
8	Spring Creek	.....	24	1	23	.....do	.90
17	Red River	.....	18	1	15	J. E. Degnan	0
June 1	.....do	.....	18	1	15	.....do	0
Aug. 2	.....do	.....	18	1	15	.....do	0
May 7	Verdigris Coulee	.....	29	2	14	.....do	0
30	.....do	.....	29	2	14	.....do	0
1913.							
May 2	Bear Gulch Creek	.....	19	2	9	.....do	10.50
June 4	.....do	.....	19	2	9	.....do	2.03
July 22	.....do	.....	19	2	9	.....do	Dry.
28	.....do	.....	19	2	9	.....do	Dry.
Sept. 1	.....do	.....	19	2	9	.....do	Dry.
16	.....do	.....	19	2	9	.....do	Dry.
Oct. 3	.....do	.....	19	2	9	.....do	Dry
22	.....do	.....	19	2	9	.....do	Dry
28	.....do	.....	19	2	9	.....do	Dry.
May 2	Deadhorse Creek	.....	4	2	11	.....do	3.91
July 22	.....do	.....	4	2	11	.....do	Dry.
28	.....do	.....	4	2	11	.....do	Dry.
Sept. 1	.....do	.....	4	2	11	.....do	Dry.
16	.....do	.....	3	2	11	.....do	Dry.
Oct. 3	.....do	.....	3	2	11	.....do	Dry.
22	.....do	.....	3	2	11	.....do	Dry.
Nov. 8	.....do	.....	3	2	11	.....do	Dry.
May 12	Deer Creek	.....	15	1	12	.....do	7.43
27	.....do	.....	15	1	12	.....do	5.07
June 5	.....do	.....	15	1	12	.....do	2.23
13	.....do	.....	15	1	12	.....do	1.03
May 2	Halfbreed Creek	.....	28	2	10	.....do	16.25
14	.....do	.....	28	2	10	.....do	27.80
28	.....do	.....	28	2	10	.....do	13.30
June 4	.....do	.....	28	2	10	.....do	5.75
16	.....do	.....	28	2	10	.....do	.33
July 5	.....do	.....	28	2	10	.....do	6.00
22	.....do	.....	28	2	10	.....do	0
28	.....do	.....	28	2	10	.....do	0
Sept. 1	.....do	.....	28	2	10	.....do	Dry.
16	.....do	.....	28	2	10	.....do	Dry.
Oct. 2	.....do	.....	28	2	10	.....do	Dry.
3	.....do	.....	28	2	10	.....do	Dry.
22	.....do	.....	28	2	10	.....do	Dry.
28	.....do	.....	28	2	10	.....do	.17

[a] Range numbers are all west of the fourth meridian.

Miscellaneous discharge measurements in Milk River drainage basin during 1900–1917—Continued.

Measurements made by Canadian engineers—Continued.

Minor tributaries—Continued.

Date.	Stream.	Locality.				Hydrographer.	Discharge.
		Quarter.	Sec.	T.	R.[a]		
1913.							*Sec.-ft.*
Nov. 8	Halfbreed Creek		28	2	10	J. E. Degnan	0.47
May 16	Kennedy Creek		3	1	5	do	3.52
Oct. 8	do		3	1	5	do	.47
July 19	Mackie Creek		19	2	18	do	4.12
Sept. 12	do		19	2	18	do	1.92
27	do		19	2	18	do	.91
Nov. 1	do		19	2	18	do	1.74
May 2	Miners Creek		11	2	11	do	10.80
14	do		11	1	11	do	14.30
July 5	do		10	2	11	do	.92
22	do		10	2	11	do	Dry.
28	do		10	2	11	do	0
Sept. 1	do		11	2	11	do	Dry.
16	do		10	2	11	do	Dry.
Oct. 3	do		10	2	11	do	0
11	do		10	2	11	do	.08
22	do		10	2	11	do	.04
28	do		10	2	11	do	.05
Nov. 5	do		10	2	11	do	.11
8	do		10	2	11	do	.64
July 1	Police Creek		35	1	13	do	1.71
21	do		35	1	13	do	Dry.
30	do		35	1	13	do	Dry.
Sept. 15	do		35	1	13	do	Dry.
Apr. 11	Red Creek		18	1	15	do	42.80
1914.							
May 30	Bear Gulch Creek		19	2	9	do	0
June 10	do		19	2	9	do	0
18	do		19	2	9	do	0
July 4	do		19	2	9	do	0
25	do		19	2	9	do	0
Sept. 19	do		19	2	9	do	0
29	do		19	2	9	do	0
Oct. 17	do		19	2	9	do	10.8
21	do		19	2	9	do	3.8
Apr. 13	Dead Horse Coulee		4	2	11	H. W. Rowley	0
28	do		4	2	11	J. E. Degnan	0
May 30	do		4	2	11	do	0
June 10	do		4	2	11	do	0
18	do		4	2	11	do	0
July 4	do		4	2	11	do	0
25	do		4	2	11	do	0
Sept. 19	do		4	2	11	do	0
29	do		4	2	11	do	0
Oct. 17	do		4	2	11	do	6.80
21	do		4	2	11	do	.79
Apr. 13	Halfbreed Creek	SW	28	2	10	H. W. Rowley	4.00
28	do	SW	28	2	10	J. E. Degnan	1.71
May 30	do	SW	28	2	10	do	0
June 10	do	SW	28	2	10	do	0
18	do	SW	28	2	10	do	5.30
July 4	do	SW	28	2	10	do	0
25	do	SW	28	2	10	do	0
Sept. 19	do	SW	28	2	10	do	0
29	do	SW	28	2	10	do	0
Oct. 17	do	SW	28	2	10	do	36.0
21	do	SW	28	2	00	do	11.0
June 26	Mackie Creek	SW	19	2	18	do	.10
Sept. 11	do	SW	19	2	18	F. R. Steinberger	0
Oct. 14	do	SW	19	2	18	J. E. Degnan	.35
26	do	SW	19	2	18	do	.32
Aug. 18	Milk River	NW	20	2	8	do	2.60
Apr. 13	Miners Coulee	SW	10	2	11	H. W. Rowley	1.41
28	do	SW	10	2	11	J. E. Degnan	.07
May 30	do	SW	10	2	11	do	0
June 10	do	SW	10	2	11	do	0
18	do	SW	10	2	11	do	0
July 4	do	SW	10	2	11	do	0
25	do	SW	10	2	11	do	0
Sept. 19	do	SW	10	2	11	do	0
29	do	SW	10	2	11	do	0

[a] Range numbers are all west of the fourth meridian.

Miscellaneous discharge measurements in Milk River drainage basin during 1900–1917—Continued.

Measurements made by Canadian engineers—Continued.

Minor tributaries—Continued.

Date.	Stream.	Locality.				Hydrographer.	Discharge.
		Quarter.	Sec.	T.	R.[a]		
1914.							*Sec.-ft.*
Oct. 17	Miners Coulee	SW...	10	2	11	J. E. Degnan	26.60
21	do	SW...	10	2	11	do	6.64
May 1	Police Creek	SW...	35	1	13	do	.35
June 9	do	SW...	35	1	13	do	0
Sept. 16	do	SW...	35	1	13	do	0
Oct. 2	do	SW...	35	1	13	do	0
16	do	SW...	35	1	13	do	8.03
Apr. 11	Red Creek	.....	18	1	15	do	0
July 28	do	SW...	18	1	15	do	0
21	do	SW...	18	1	15	do	0
Sept. 30	Spring Creek	SE...	3	1	12	do	.11
17	do	SE...	3	1	12	do	.13
Oct. 22	do	NE...	11	1	12	do	.28
Apr. 30	Deer Creek	SW...	15	1	12	do	.47
June 1	do	SW...	15	1	12	do	.08
2	do	SW...	15	1	12	do	.12
20	do	SW...	15	1	12	do	.61
21	do	SW...	15	1	12	do	1.19
Aug. 25	do	SW...	15	1	12	F. R. Steinberger	0
Sept. 4	do	SW...	15	1	12	do	0
17	do	SE...	5	1	12	J. E. Degnan	.38
17	do	SW...	15	1	12	do	.03
Oct. 1	do	SE...	5	1	12	do	.39
1	do	NW...	4	1	12	do	.34
1	do	NE...	9	1	12	do	.16
1	do	SW...	15	1	12	do	.17
1	do	SW...	15	1	12	do	.05
1	do	NW...	15	1	12	do	0
17	do	SW...	36	1	12	do	22.3
1915.							
Mar. 29	Bear Gulch Creek	.....	30	2	9	W. H. Story	1.190
Apr. 12	do	.....	30	2	9	do	1.050
22	do	.....	30	2	9	do	.360
May 4	do	.....	30	2	9	do	.400
19	do	.....	30	2	9	do	3.720
June 14	do	.....	30	2	9	do	5.500
25	do	.....	30	2	9	do	9.500
July 12	do	.....	30	2	9	do	1.880
23	do	.....	30	2	9	do	2.870
30	do	.....	30	2	9	do	7.900
Aug. 9	do	.....	30	2	9	do	1.850
17	do	.....	30	2	9	do	8.400
27	do	.....	30	2	9	do	[b].217
Sept. 3	do	.....	30	2	9	do	[b].171
17	do	.....	30	2	9	do	.530
23	do	.....	30	2	9	do	.560
Oct. 6	do	.....	30	2	9	do	.480
12	do	.....	30	2	9	do	.420
21	do	.....	30	2	9	do	.160
29	do	.....	30	2	9	do	.270
12	Beaver oil well artesian flow	SE...	24	2	11	do	[b].360
12	do	SE...	24	2	11	do	.380
29	do	SE...	24	2	11	do	.310
June 14	Coulee	SE...	14	2	11	do	1.600
25	do	SE...	14	2	11	do	0
July 12	do	SE...	14	2	11	do	0
23	do	SE...	14	2	11	do	0
30	do	SE...	14	2	11	do	.740
Aug. 9	do	SE...	14	2	11	do	0
17	do	SE...	14	2	11	do	0
27	do	SE...	14	2	11	do	0
Sept. 3	do	SE...	14	2	11	do	0
17	do	SE...	14	2	11	do	0
23	do	SE...	14	2	11	do	0
Oct. 6	do	SE...	14	2	11	do	0
12	do	SE...	14	2	11	do	0
21	do	SE...	14	2	11	do	0
29	do	SE...	14	2	11	do	0
Mar. 20	do	.....	19	2	11	do	.880
20	do	.....	30	2	10	do	9.360

[a] Range numbers are all west of the fourth meridian. [b] Weir measurement.

Miscellaneous discharge measurements in Milk River drainage basin during 1900–1917—Continued.

Measurements made by Canadian engineers—Continued.

Minor tributaries—Continued.

Date.	Stream.	Locality.				Hydrographer.	Discharge.
		Quarter.	Sec.	T.	R.[a]		
1915.							*Sec.-ft.*
Apr. 7	Beaver oil well artesian flow.	SE....	21	2	17	W. H. Story.....	1.100
27	.....do.....	.....	21	2	17	.....do.....	0
May 25	.....do.....	.....	21	2	17	G. H. Whyte and W. H. Storey.	0
June 21	.....do.....	.....	21	2	17	W. H. Storey.....	.670
July 18	.....do.....	.....	21	2	17	.....do.....	0
Aug. 4	.....do.....	.....	21	2	17	.....do.....	0
23	.....do.....	.....	21	2	17	.....do.....	0
Sept. 9	.....do.....	.....	21	2	17	.....do.....	0
29	.....do.....	.....	21	2	17	.....do.....	0
Oct. 17	.....do.....	.....	21	2	17	.....do.....	0
Mar. 29	Dead Horse Creek.....	.....	4	2	11	.....do.....	2.170
Apr. 12	.....do.....	.....	4	2	11	.....do.....	1.080
22	.....do.....	.....	4	2	11	.....do.....	.230
May 4	.....do.....	.....	4	2	11	.....do.....	0
19	.....do.....	.....	4	2	11	.....do.....	.510
31	.....do.....	.....	4	2	11	G. H. Whyte and W. H. Storey.	0
June 14	.....do.....	.....	4	2	11	W. H. Storey.....	4.700
25	.....do.....	.....	4	2	11	.....do.....	3.000
July 12	.....do.....	.....	4	2	11	.....do.....	.500
22	.....do.....	.....	4	2	11	.....do.....	[b].125
30	.....do.....	.....	4	2	11	.....do.....	3.300
Aug. 9	.....do.....	.....	4	2	11	.....do.....	0
17	.....do.....	.....	4	2	11	.....do.....	0
27	.....do.....	.....	4	2	11	.....do.....	0
Sept. 3	.....do.....	.....	4	2	11	.....do.....	[b].093
17	.....do.....	.....	4	2	11	.....do.....	.410
23	.....do.....	.....	4	2	11	.....do.....	[b].018
Oct. 6	.....do.....	.....	4	2	11	.....do.....	.450
12	.....do.....	.....	4	2	11	.....do.....	[b].171
21	.....do.....	.....	4	2	11	.....do.....	[b].171
29	.....do.....	.....	4	2	11	.....do.....	[b].194
Mar. 19	Deer Creek.....	NE...	26	1	12	.....do.....	1.320
29	.....do.....	NE...	26	1	12	.....do.....	.450
Apr. 12	.....do.....	NE...	26	1	12	.....do.....	1.100
22	.....do.....	NE...	26	1	12	.....do.....	1.190
May 4	.....do.....	NE...	26	1	12	.....do.....	.630
19	.....do.....	NE...	26	1	12	.....do.....	7.720
June 15	.....do.....	NE...	26	1	12	.....do.....	6.000
24	.....do.....	NE...	26	1	12	.....do.....	6.500
July 12	.....do.....	NE...	26	1	12	.....do.....	2.600
22	.....do.....	NE...	26	1	12	.....do.....	2.530
30	.....do.....	NE...	26	1	12	.....do.....	5.500
Aug. 8	.....do.....	NE...	26	1	12	.....do.....	1.730
17	.....do.....	NE...	26	1	12	.....do.....	.720
26	.....do.....	NE...	26	1	12	.....do.....	.730
Sept. 3	.....do.....	NE...	26	1	12	.....do.....	.890
16	.....do.....	NE...	26	1	12	.....do.....	.630
23	.....do.....	NE...	26	1	12	.....do.....	.610
Oct. 5	.....do.....	NE...	26	1	12	.....do.....	1.430
12	.....do.....	NE...	26	1	12	.....do.....	.810
20	.....do.....	NE...	26	1	12	.....do.....	.830
29	.....do.....	NE...	26	1	12	.....do.....	.870
Apr. 23	Dickinson ditch.....	SW...	15	1	12	.....do.....	.420
May 3	.....do.....	SW...	15	1	12	.....do.....	0
June 15	.....do.....	SW...	15	1	12	.....do.....	0
24	.....do.....	SW...	15	1	12	.....do.....	0
July 22	.....do.....	SW...	15	1	12	.....do.....	[b].388
Aug. 8	.....do.....	SW...	15	1	12	.....do.....	[b].109
18	.....do.....	SW...	15	1	12	.....do.....	[b].388
26	.....do.....	SW...	15	1	12	.....do.....	[b].288
Sept. 4	.....do.....	SW...	15	1	12	.....do.....	[b].109
16	.....do.....	SW...	15	1	12	.....do.....	[b].148
24	.....do.....	SW...	15	1	12	.....do.....	[b].109
Oct. 9	.....do.....	SW...	15	1	12	.....do.....	[b].093
13	.....do.....	SW...	15	1	12	.....do.....	[b].109
20	.....do.....	SW...	15	1	12	.....do.....	[b].125
Mar. 18	Davis Coulee.....	SE...	35	1	13	.....do.....	.....
30	.....do.....	SE...	35	1	13	.....do.....	0

[a] Range numbers are all west of the fourth meridian. [b] Weir measurement.

Miscellaneous discharge measurements in Milk River drainage basin during 1900–1917—Continued.

Measurements made by Canadian engineers—Continued.

Minor tributaries—Continued.

Date.	Stream.	Locality.				Hydrographer.	Discharge.
		Quarter.	Sec.	T.	R.[a]		
1915.							*Sec.-ft.*
Apr. 11	Davis Coulee	SE.	35	1	13	W. H. Storey	0
22	do	SE.	35	1	13	do	0
May 2	do	SE.	35	1	13	do	0
20	do		35	1	13	do	0
30	do	SE.	35	1	13	G. H. Whyte and W. H. Storey.	0
June 15	do	SE.	35	1	13	W. H. Storey	1.080
23	do	SE.	35	1	13	do	0
July 13	do	SE.	35	1	13	do	.160
21	do	SE.	35	1	13	do	0
30	do	SE.	35	1	13	do	.400
Aug. 7	do	SE.	35	1	13	do	0
18	do	SE.	35	1	13	do	0
25	do	SE.	35	1	13	do	0
Sept. 4	do	SE.	35	1	13	do	*b*.061
15	do	SE.	35	1	13	do	0
24	do	SE.	35	1	13	do	0
Oct. 2	do	SE.	35	1	13	do	0
4	do	SE.	35	1	13	do	0
13	do	SE.	35	1	13	do	0
19	do	SE.	35	1	13	do	0
30	do	SE.	35	1	13	do	0
May 3	Spring at Drader ranch	SE.	9	1	12	do	*b*.011
24	do	SE.	9	1	12	do	.011
Aug. 8	do	SE.	9	1	12	do	*b*.004
Mar. 29	Half-Breed Creek		28	2	10	do	2.630
Apr. 12	do		28	2	10	do	2.060
22	do		28	2	10	do	2.050
May 4	do		28	2	10	do	*b*.367
19	do		28	2	10	do	3.520
June 14	do		28	2	10	do	3.600
25	do		28	2	10	do	10.600
July 12	do		28	2	10	do	2.600
23	do		28	2	10	do	4.020
30	do		28	2	10	do	7.320
Aug. 9	do		28	2	10	do	*b*2.600
17	do		28	2	10	do	.540
27	do		28	2	10	do	*b*.388
Sept. 3	do		28	2	10	do	*b*.061
17	do		28	2	10	do	.620
23	do		28	2	10	do	.570
Oct. 6	do		28	2	10	do	.960
12	do		28	2	10	do	.910
21	do		28	2	10	do	.860
29	do		28	2	10	do	1.000
Mar. 25	Kennedy Creek	SE.	3	1	5	do	5.220
Apr. 14	do	SE.	3	1	5	do	0
15	do	SE.	3	1	5	do	0
20	do	SE.	3	1	5	do	0
May 6	do	SE.	3	1	5	do	0
June 2	do	SE.	3	1	5	G. H. Whyte and W. H. Storey.	0
11	do	SE.	3	1	5	W. H. Storey	0
28	do	SE.	3	1	5	do	4.600
July 26	do	SE.	3	1	5	do	0
Aug. 12	do	SE.	3	1	5	do	0
30	do	SE.	3	1	5	do	0
Sept. 20	do	SE.	3	1	5	do	0
Oct. 8	do	SE.	3	1	5	do	0
27	do	SE.	3	1	5	do	0
Mar. 25	Lost River		11	2	5	do	4.930
May 4	Macdonald Creek		32	1	11	do	*b*.138
19	do		32	1	11	do	.640
June 14	do		32	1	11	do	2.000
25	do		32	1	11	do	2.270
July 12	do		32	1	11	do	.940
22	do		32	1	11	do	*b*.171
30	do		32	1	11	do	1.440
Aug. 9	do		32	1	11	do	0
17	do		32	1	11	do	0
26	do		32	1	11	do	0

[a] Range numbers are all west of the fourth meridian. [b] Weir measurement.

Miscellaneous discharge measurements in Milk River drainage basin during 1900–1917—Continued.

Measurements made by Canadian engineers—Continued.

Minor tributaries—Continued.

Date.	Stream.	Locality.				Hydrographer.	Discharge.
		Quarter.	Sec.	T.	R.[a]		
1915.							*Sec.-ft.*
Sept. 3	Macdonald Creek		32	1	11	W. H. Storey	[b]125
17	do		32	1	11	do	.250
23	do		32	1	11	do	[b].027
Oct. 6	do		32	1	11	do	.350
12	do		32	1	11	do	[b].171
21	do		32	1	11	do	[b].148
29	do		32	1	11	do	[b].171
Apr. 6	Mackie Creek		19	2	18	do	.800
28	do		19	2	18	do	.620
June 21	do		19	2	18	do	1.960
July 18	do		19	2	18	do	4.200
Aug. 4	do		19	2	18	do	3.400
24	do		19	2	18	do	2.650
Sept. 9	do		19	2	18	do	2.400
29	do		19	2	18	do	2.500
Oct. 17	do		19	2	18	do	2.400
Mar. 29	Miners Creek		10	2	11	do	2.120
Apr. 12	do		10	2	11	do	1.529
22	do		10	2	11	do	.810
May 4	do		10	2	11	do	[b].229
19	do		10	2	11	do	3.920
31	do		10	2	11	G. H. Whyte and W. H. Storey.	.....
June 14	do		10	2	11	W. H. Storey	8.700
25	do		10	2	11	do	5.000
July 12	do		10	2	11	do	2.600
23	do		10	2	11	do	3.060
30	do		10	2	11	do	7.200
Aug. 9	do		10	2	11	do	2.200
17	do		10	2	11	do	.350
27	do		10	2	11	do	[b].288
Sept. 3	do		10	2	11	do	[b].125
17	do		10	2	11	do	.720
23	do		10	2	11	do	.360
Oct. 6	do		10	2	11	do	.930
12	do		10	2	11	do	2.110
21	do		10	2	11	do	1.070
29	do		10	2	11	do	1.170
Mar. 13	Police Creek	SW.	35	1	13	do	2.560
17	do	SW.	35	1	13	do	7.640
30	do	SW.	35	1	13	do	1.420
Apr. 2	do	SW.	35	1	13	do	6.050
11	do	SW.	35	1	13	do	1.540
23	do	SW.	35	1	13	do	.800
May 2	do	SW.	35	1	13	do	.220
20	do	SW.	35	1	13	do	.260
29	do	SW.	35	1	13	G. H. Whyte and W. H. Storey.	[b].121
June 15	do	SW.	35	1	13	W. H. Storey	7.600
23	do	SW.	35	1	13	do	2.500
July 13	do	SW.	35	1	13	do	1.680
21	do	SW.	35	1	13	do	1.470
30	do	SW.	35	1	13	do	4.200
Aug. 7	do	SW.	35	1	13	do	2.400
18	do	SW.	35	1	13	do	.280
25	do	SW.	35	1	13	do	.560
Sept. 4	do	SW.	35	1	13	do	1.240
15	do	SW.	35	1	13	do	1.210
24	do	SW.	35	1	13	do	[b].240
Oct. 2	do	SW.	35	1	13	do	.570
4	do	SW.	35	1	13	do	1.390
13	do	SE.	3	1	13	do	2.500
13	do	SW.	35	1	13	do	1.430
19	do	SW.	35	1	13	do	1.240
30	do	SW.	35	1	13	do	.700
Mar. 16	Red Creek		18	1	15	do	7.430
Apr. 10	do		18	1	15	do	.210
May 1	do		18	1	15	do	.230
21	do		18	1	15	do	0
June 16	do		18	1	15	do	0
22	do		18	1	15	do	0

[a] Range numbers are all west of the fourth meridian.
[b] Weir measurement.

Miscellaneous discharge measurements in Milk River drainage basin during 1900–1917—Continued.

Measurements made by Canadian engineers—Continued.

Minor tributaries—Continued.

Date.	Stream.	Locality.				Hydrographer.	Discharge.
		Quarter.	Sec.	T.	R.[a]		
1915.							*Sec.-ft.*
July 14	Red Creek	.....	18	1	15	W. H. Storey	0
Aug. 1	.....do	.....	18	1	15	.....do	0
Sept. 5	.....do	.....	18	1	15	.....do	0
25	.....do	.....	35	1	15	.....do	0
Oct. 1	.....do	.....	35	1	15	.....do	0
14	.....do	.....	35	1	15	.....do	0
19	.....do	.....	35	1	15	.....do	0
31	.....do	.....	35	1	15	.....do	0
Mar. 13	Rocky Coulee	SW...	35	1	13	.....do	1.500
17	.....do	SW...	35	1	13	.....do	2.120
30	.....do	SW...	35	1	13	.....do	0
Apr. 11	.....do	SW...	35	1	13	.....do	0
23	.....do	SW...	35	1	13	.....do	0
May 2	.....do	SW...	35	1	13	.....do	0
20	.....do	SW...	35	1	13	.....do	0
30	.....do	SW...	35	1	13	G. H. Whyte and W. H. Storey.	0
June 15	.....do	SW...	35	1	13	W. H. Storey	1.180
23	.....do	SW...	35	1	13	.....do	[b].151
July 13	.....do	SW...	35	1	13	.....do	.490
21	.....do	SW...	35	1	13	.....do	0
30	.....do	SW...	35	1	13	.....do	1.390
Aug. 7	.....do	SW...	35	1	13	.....do	0
18	.....do	SW...	35	1	13	.....do	0
25	.....do	SW...	35	1	13	.....do	0
Sept. 4	.....do	SW...	35	1	13	.....do	[b].148
15	.....do	SW...	35	1	13	.....do	[b].109
24	.....do	SW...	35	1	13	.....do	0
Oct. 2	.....do	SW...	35	1	13	.....do	0
4	.....do	SW...	35	1	13	.....do	0
13	.....do	SW...	35	1	13	.....do	0
19	.....do	SW...	35	1	13	.....do	0
30	.....do	SW...	35	1	13	.....do	0
Aug. 17	Sage Creek	NW...	15	1	2	H. R. Carscallen	47
May 4	Sims' ditch	SE....	31	1	11	W. H. Storey	[b].138
19	.....do	SE....	31	1	11	.....do	.510
June 14	.....do	SE....	31	1	11	.....do	0
25	.....do	SE....	31	1	11	.....do	0
July 12	.....do	SE....	31	1	11	.....do	.510
22	.....do	SE....	31	1	11	.....do	0
30	.....do	SE....	31	1	11	.....do	0
Aug. 9	.....do	SE....	31	1	11	.....do	0
17	.....do	SE....	31	1	11	.....do	0
27	.....do	SE....	31	1	11	.....do	0
Sept. 3	.....do	SE....	31	1	11	.....do	0
17	.....do	SE....	31	1	11	.....do	0
23	.....do	SE....	31	1	11	.....do	0
Oct. 6	.....do	SE....	31	1	11	.....do	0
12	.....do	SE....	31	1	11	.....do	0
21	.....do	SE....	31	1	11	.....do	0
29	.....do	SE....	31	1	11	.....do	0
Mar. 29	Spring Creek	SW...	31	1	11	.....do	1.180
Apr. 12	.....do	SW...	31	1	11	.....do	.480
May 4	.....do	SW...	31	1	11	.....do	0
19	.....do	SW...	31	1	11	.....do	.260
June 14	.....do	SW...	31	1	11	.....do	2.900
25	.....do	SW...	31	1	11	.....do	.740
July 12	.....do	SW...	31	1	11	.....do	.600
22	.....do	SW...	31	1	11	.....do	[b].360
30	.....do	SW...	31	1	11	.....do	1.580
Aug. 9	.....do	SW...	31	1	11	.....do	[b].360
17	.....do	SW...	31	1	11	.....do	.350
27	.....do	SW...	31	1	11	.....do	[b].240
Sept. 3	.....do	SW...	31	1	11	.....do	[b].171
16	.....do	SW...	31	1	11	.....do	.250
23	.....do	SW...	31	1	11	.....do	.140
Oct. 6	.....do	SW...	31	1	11	.....do	.280
12	.....do	SW...	31	1	11	.....do	[b].148
21	.....do	SW...	31	1	11	.....do	.130
29	.....do	SW...	31	1	11	.....do	[b].045
Mar. 12	Verdigris Coulee	SE....	29	2	14	.....do	0
14	.....do	SE....	29	2	14	.....do	2.160

[a] Range numbers are all west of the fourth meridian
[b] Weir measurement.

Miscellaneous discharge measurements in Milk River drainage basin during 1900–1917—Continued.

Measurements made by Canadian engineers—Continued.

Minor tributaries—Continued.

Date.	Stream.	Locality.				Hydrographer.	Discharge.
		Quarter.	Sec.	T.	R.[a]		
1915.							*Sec.ft.*
Apr. 2	Virdigris Coulee	SE.	29	2	14	W. H. Storey	0.330
24	....do	SE.	29	2	14	....do	0
July 20	....do	SE.	29	2	14	....do	0
Aug. 6	....do	SE.	29	2	14	....d	0
19	....do	SE.	29	2	14	....do	0
25	....do	SE.	29	2	14	....do	0
Sept. 13	....do	SE.	29	1	14	....do	[b].148
Mar. 13	Deer Creek	SW.	15	1	12	....do	2.700
19	....do	SW.	15	1	12	....do	1.270
Apr. 22	....do	SW.	15	1	12	....do	1.870
May 3	....do	SW.	15	1	12	....do	.960
June 25	Ditch on Fornfeist ranch	NW.	30	1	11	....do	0
July 22	....do		31	1	11	....do	[b].360
30	....do		31	1	11	....do	0
Aug. 9	....do		31	1	11	....do	[b].388
17	....do		31	1	11	....do	.300
26	....do		31	1	11	....do	[b].217
Sept. 3	....do		31	1	11	....do	0
Apr. 12	Ditch at Hall's ranch	SE.	28	2	10	....do	.490
22	....do	SE.	28	2	10	....do	1.300
May 4	....do	SE.	28	2	10	....do	0
19	....do	SE.	28	2	10	....do	.650
June 14	....do	SE.	28	2	10	....do	0
25	....do	SE.	28	2	10	....do	0
July 12	....do	SE.	28	2	10	....do	.860
23	....do	SE.	28	2	10	....do	1.250
30	....do	SE.	28	2	10	....do	3.800
Aug. 9	....do	SE.	28	2	10	....do	2.100
17	....do	SE.	28	2	10	....do	0
27	....do	SE.	28	2	10	....do	0
Sept. 3	....do	SE.	28	2	10	....do	0
17	....do	SE.	28	2	10	....do	0
23	....do	SE.	28	2	10	....do	0
Oct. 6	....do	SE.	28	2	10	....do	.280
12	....do	SE.	28	2	10	....do	.260
21	....do	SE.	28	2	10	....do	0
29	....do	SE.	28	2	10	....do	.006

Lodge Creek and tributaries.

Date.	Stream.	Locality.					Hydrographer.	Discharge.
		Quarter.	Sec.	T.	R.W.	Mer.		
1897.								*Sec.-ft.*
July 13	Lodge Creek		36	4	2	4	R. W. MacIntyre	1.63
7	Lodge Creek, east branch		13	7	3	4	....do	5.34
1906.								
Aug. —	Middle Creek		8	4	29	3	R. J. Burley	.63
1908.								
Sept. 19	Lodge Creek		25	2	30	3	F. T. Fletcher	0
Nov. 9	....do	NW.	29	5	2	4	R. J. Burley	0
Sept. 19	Middle Creek		9	4	29	3	F. T. Fletcher	0
21	....do		17	4	29	3	....do	0
1909.								
July 14	Lodge Creek	NW.	29	7	3	4	....do	[b].14
22	....do		15	6	3	4	....do	Dry.
22	....do		27	6	3	4	....do	Dry.
22	Lodge Creek, east branch		22	6	3	4	....do	Dry.
21	Middle Creek		36	5	2	4	....do	Dry.
Oct. 26	....do		22	5	30	3	R. J. Burley	Dry.
May 31	Spring Creek		33	6	2	4	....do	[b].818
31	....do	NE.	29	6	2	4	....do	[b].08
1910.								
July 29	Small branch of Middle Creek.		2	6	1	4	H. R. Carscallen	.05
30	....do		16	7	2	4	....do	.02
13	Lodge Creek, east branch		19	7	2	4	....do	.02
June 14	Middle Creek		9	4	29	3	....do	.1
July 9	....do		9	4	29	3	....do	.08

[a] Range numbers are all west of the fourth meridian. [b] Weir measurement.

Miscellaneous discharge measurements in Milk River drainage basin during 1900–1917—Continued.

Measurements made by Canadian engineers—Continued.

Lodge Creek and tributaries—Continued.

Date.	Stream.	Locality.					Hydrographer.	Discharge.
		Quarter.	Sec.	T.	R. W.	Mer.		
1910.								*Sec. ft.*
July 28	Middle Creek		9	4	29	3	H. R. Carscellen	0.03
Aug. 15	do		9	4	29	3	do	.04
June 13	do		4	2	29	3	do	0
1911.								
May 17	Lodge Creek		4	2	29	3	M. H. French	3.330
June 8	do		4	2	29	3	do	1.935
Sept. 8	do	NE	24	2	30	3	W. A. Fletcher	222.400
Apr. 25	Lodge Creek, east branch		25	6	3	4	M. H. French	4.900
May 22	do		22	6	3	4	do	2.870
June 13	do		22	6	3	4	do	.055
Apr. 21	Middle Creek		3	4	29	3	do	1.520
29	do		14	6	2	4	do	1.230
May 23	Middle Creek, east branch		14	6	2	4	do	1.080
Apr. 29	Mitchell Creek		13	6	2	4	do	.490
May 22	do		13	6	2	4	do	3.870
Apr. 28	Read Creek		34	6	3	4	do	.290
May 22	do		34	6	3	4	do	.362
June 13	do		34	6	3	4	do	.080
May 22	Sexton Creek		21	7	3	4	do	.551
June 13	do		21	7	3	4	do	.167
13	Spring Creek		22	5	2	4	do	.118
July 21	do		22	5	2	4	do	.190
1913.								
Apr. 21	Lodge Creek	NE	36	4	2	4	H. D. St. A. Smith	87
Oct. 5	Middle Creek	SW	9	4	29	3	do	.037
July 15	do	SE	33	5	1	4	H. O. Brown	.30
1916.								
May 26	Bare Creek	SW	25	3	1	4	H. W. Rowley	2.70
July 14	do	SW	25	3	1	4	do	0
Aug. 7	do	SW	25	3	1	4	do	0
26	do	SW	25	3	1	4	do	0
Oct. 31	do	SW	25	3	1	4	do	0
May 9	Middle Creek	SW	35	5	1	4	do	[a] 1.44
23	do	SW	35	5	1	4	do	[a] 2.09
June 19	do	SW	35	5	1	4	do	3.80
July 14	do	SW	35	5	1	4	do	[a] 2.10
Aug. 4	do	SW	35	5	1	4	do	[a] 2.20
24	do	SW	35	5	1	4	do	[a] .96
Sept. 20	do	SW	35	5	1	4	do	[a] 1.00
Oct. 9	do	SW	35	5	1	4	do	1.24
Nov. 8	do	SW	35	5	1	4	do	[a] 1.62
May 22	Lodge Creek	NW	10	6	3	4	do	2.00
July 12	do	SW	15	6	3	4	do	4.20
Aug. 23	do	SW	15	6	3	4	do	[a] .98
Nov. 7	do	SW	15	6	3	4	do	2.30
May 26	do	NE	25	3	1	4	do	22.00
July 15	do	NE	25	3	1	4	do	5.10
Aug. 7	do	NE	25	3	1	4	do	3.80
26	do	NE	25	3	1	4	do	[a] 1.34
Oct. 31	do	NE	25	3	1	4	do	4.80
May 18	Sexton Creek	SW	21	7	3	4	do	[a] .50
June 16	do	SW	21	7	3	4	do	[a] 1.66
July 11	do	SW	21	7	3	4	do	[a] .41
Aug. 2	do	SW	21	7	3	4	do	[a] .17
22	do	SW	21	7	3	4	do	[a] .22
Sept. 16	do	SW	21	7	3	4	do	[a] .26

Battle Creek and tributaries.

1897.								
July 19	Battle Creek		35	4	27	3	R. W. MacIntyre	29.37
Aug. 14	do		36	7	30	3	do	6.1
1907.								
Sept. 18	Battle Creek		30	4	26	3	R. J. Burley	23.57
1908.								
Sept. 14	Battle Creek	SE	36	4	26	3	R. J. Burley	.79
1909.								
June 8	Battle Creek	NW	3	7	29	3	F. T. Fletcher	36.75
16	do	NW	3	7	29	3	R. J. Burley	5.65
21	do	SW	23	8	1	4	do	122.65
Sept. 24	do		29	4	26	3	F. T. Fletcher	11.01
27	do		1	6	28	3	do	12.42

[a] Weir measurement.

Miscellaneous discharge measurements in Milk River drainage basin during 1909–1917—Continued.

Measurements made by Canadian engineers—Continued.

Battle Creek and tributaries—Continued.

Date.	Stream	Locality.					Hydrographer.	Discharge.
		Quarter.	Sec.	T.	R.W.	Mer.		
1909.								*Sec.-ft.*
June 7	Gaff Creek	SE.	3	7	29	3	F. T. Fletcher	0.44
17	Grayburn Creek	NE.	14	8	1	4	do	4.74
1908.								
Oct. 12	Sixmile Creek		32	7	28	3	R. J. Burley	.59
1909.								
June 7	Sixmile Creek		11	8	29	3	F. T. Fletcher	4.57
4	Spring Creek		24	7	29	3	do	.33
8	Whitemud Coulee		23	7	29	3	do	.14
1910.								
June 9	Battle Creek		1	6	28	3	H. R. Carscallen	7.43
11	do		23	8	1	4	F. T. Fletcher	5.75
30	do		30	5	28	3	H. R. Carscallen	4.03
July 6	do		20	4	26	3	do	.88
15	do		21	7	29	3	do	2.54
Aug. 2	do		31	7	29	3	do	2.25
10	do		20	4	26	3	do	2.16
11	do		29	5	28	3	do	2.56
18	do		29	7	29	3	do	4.47
1	Creek, branch of Battle Creek.		21	7	29	3	do	.03
17	do		21	7	29	3	do	.13
June 13	Fourmile Creek	SW.	12	8	29	3	F. T. Fletcher	1.49
15	Grayburn Creek		13	8	1	4	do	2.14
July 14	do		13	8	1	4	H. R. Carscallen	1.28
Aug. 2	do		13	8	1	4	do	.90
17	do		13	8	1	4	do	1.31
June 9	Marshall & Gaff ditch		27	5	29	3	do	9.94
July 4	do		34	5	29	3	do	2.14
27	do		34	5	29	3	do	1.18
Aug. 13	do		34	5	29	3	do	.59
Sept. 28	do		34	5	29	3	R. G. Swan	3.82
Oct. 25	do		34	5	29	3	do	3.16
20	McKinnon ditch		30	4	26	3	do	2.92
July 15	Mink Creek	SE.	31	7	29	3	H. R. Carscallen	.03
Aug. 18	do	SE.	31	7	29	3	do	.08
July 6	Richardson ditch		31	4	26	3	do	1.97
22	do		31	4	26	3	do	.54
15	Wood & Anderson ditch		21	7	29	3	do	.02
1911.								
Apr. 18	Battle Creek		31	5	27	3	M. H. French	100.840
May 11	do		36	4	27	3	do	42.520
June 5	do		36	4	27	3	do	18.730
July 11	do		36	4	27	3	do	18.250
Aug. 10	do	SE.	1	6	28	3	J. Kay	32.640
16	do		13	8	1	4	M. H. French	2.040
June 26	Fourmile Coulee		11	8	29	3	J. Kay	12.840
26	do		11	8	29	3	R. J. Burley	9.760
July 1	do		11	8	29	3	M. H. French	7.330
June 16	Grayburn Creek		13	8	1	4	do	2.260
Aug. 16	do		13	8	1	4	do	1.860
15	Mink Creek		31	7	29	3	do	.213
June 9	Marshall & Gaff ditch		26	5	29	3	do	6.070
July 6	do		34	5	29	3	do	5.760
June 16	Ninemile Coulee		36	7	30	3	do	1.820
Aug. 15	do		36	7	30	3	do	1.450
17	Sixmile Coulee		12	8	29	3	do	1.100
June 17	Spring Creek		21	7	29	3	do	.227
17	do		31	7	29	3	do	.235
1912.								
July 1	Battle Creek		16	2	26	3	G. R. Elliott	11.59
Nov. 21	do	NW.	21	7	29	3	do	8.12
1913.								
June 9	Battle Creek	NW.	31	7	29	3	H. O. Brown	17.1
9	do	SW.	9	7	29	3	do	21.0
13	do	SE.	21	6	29	3	do	23.0

Miscellaneous discharge measurements in Milk River drainage basin during 1909–1917—Continued.

Measurements made by Canadian engineers—Continued.

Battle Creek and tributaries—Continued.

Date.	Stream.	Locality.					Hydrographer.	Discharge.
		Quarter.	Sec.	T.	R. W. of 4th Mer.	Mer.		
1913.								*Sec.-ft.*
June 2	Branch of Battle Creek	NW	29	7	29	3	H. O. Brown	*a*0.34
3	Fourmile Coulee	SE	11	8	29	3	do	3.22
10	do	SE	11	8	29	3	do	*a*2.16
17	do	SE	11	8	29	3	do	*a*1.73
2	Mink Creek	SE	31	7	29	3	H. R. Carscallen	*a* .63
9	do	SE	21	7	29	3	H. O. Brown	*a* .47
4	Sixmile Coulee	SW	6	7	28	3	do	1.59
10	do	SW	6	7	28	3	do	*a* .22
3	Spring Creek	NE	21	7	29	3	do	*a* .28
9	do	NE	21	7	29	3	do	*a* .29
3	do	SE	11	8	29	3	do	*a* .13
4	do	SW	3	7	29	3	do	*a* .23
May 31	Whitemud Coulee	SW	26	7	29	3	do	*a* .18
June 2	do	SW	26	7	29	3	H. R. Carscallen	*a* .16
2	do	SW	26	7	29	3	do	*a* .75
11	do	SW	26	7	29	3	H. O. Brown	*a* .08
17	do	SW	26	7	29	3	do	*a*1.73
1914.								
June 3	Fourmile Coulee	NW	14	8	29	3	H. W. Rowley	2.70
July 20	do	NW	14	8	29	3	do	.37
Aug. 7	Battle Creek		28	5	28	3	do	2.20
Sept. 29	do	SW	4	1	26	3	do	0
Oct. 30	do	SW	4	1	26	3	do	7.60
Sept. 30	do		16	2	26	3	do	3.50
1916.								
Aug. 11	Sixmile Creek		12	8	29	3	H. W. Rowley	11.10
May 11	Tenmile Creek		4	6	29	3	do	*a* .49
31	do		4	6	29	3	do	12.20
June 26	do		4	6	29	3	do	*a* .50
July 18	do		4	6	29	3	do	*a* .43
Aug. 9	do		4	6	29	3	do	*a* .50
29	do		4	6	29	3	do	*a* .19
Sept. 23	do		4	6	29	3	do	.0
Oct. 10	do		4	6	29	3	do	.0

Frenchman River and tributaries.

1896.								
Sept. 17	Frenchman River		29	6	21	3	R. W. MacIntyre	23.2
1897.								
July 22	Belanger Creek		25	6	26	3	R. W. MacIntyre	7.29
1907.								
Aug. 23	Belanger Creek		6	7	25	3	R. J. Burley	4.57
23	Davis Creek		27	7	25	3	do	(*b*)
July 30	Frenchman River	NW	24	6	23	3	do	32.5
31	Frenchman River, north branch.		15	7	22	3	do	6.84
Aug. 23	Sucker Creek		16	7	26	3	F. T. Fletcher	1.05
1908.								
June 19	Davis Creek		27	7	25	3	F. T. Fletcher	3.05
Aug. 7	Fairwell Creek		7	8	23	3	do	0
7	Fairwell Creek, west branch.		9	8	24	3	do	0
17	Lonepine Creek		27	7	26	3	do	*a*.6
17	do		27	7	26	3	do	.63
22	Sucker Creek		..	6	26	3	do	Dry.
July 20	Spring Creek		18	7	22	3	do	.28
20	do		17	7	22	3	do	.28
Aug. 22	Warlodge Creek		14	7	27	3	do	*a*.12
22	Warlodge Creek, branch of.		14	7	27	3	do	*a*.15
June 10	Belanger Creek		12	8	26	3	R. J. Burley	1.84
10	do		12	8	26	3	do	1.81
Aug. 17	do	SW	30	6	25	3	F. T. Fletcher	2.75
20	do		21	8	26	3	do	.61
28	do		14	8	26	3	do	.97
July 17	Calf Creek		5	8	22	3	do	2.13

a Weir measurement. *b* No flow.

Miscellaneous discharge measurements in Milk River drainage basin during 1900–1917—Continued.

Measurements made by Canadian engineers—Continued.

Frenchman River and tributaries—Continued.

Date.	Stream.	Locality.					Hydrographer.	Discharge.
		Quarter.	Sec.	T.	R. W.	Mer.		
1909.								*Sec.-ft.*
May 25	Belanger Creek	.....	30	6	25	3	H. R. Carscallen	24.4
26	....do	.....	7	7	25	3	....do	10.7
Sept. 14	....do	SE.	14	8	26	3	F. T. Fletcher	2.51
July 14	Black Tail Creek	.....	30	6	23	3	H. R. Carscallen	*a*.11
Aug. 3	....do	.....	31	6	23	3	....do	*a*.07
24	....do	.....	30	6	23	3	F. T. Fletcher	.23
Sept. 24	....do	.....	30	6	23	3	H. R. Carscallen	.17
Aug. 2	Calf Creek	.....	5	8	22	3	....do	1.48
21	....do	.....	5	8	22	3	F. T. Fletcher	1.55
23	....do	.....	5	8	22	3	....do	1.56
Sept. 20	....do	.....	5	8	22	3	H. R. Carscallen	1.83
Apr. 19	Rose Creek	.....	22	7	22	3	F. T. Fletcher	5.02
Aug. 2	....do	.....	22	7	22	3	....do	.17
Sept. 20	....do	.....	22	7	22	3	H. R. Carscallen	.03
13	Dip Creek	SE.	7	8	25	3	F. T. Fletcher	.26
Aug. 23	Doyles Coulee	NW.	17	7	22	3	....do	.22
Sept. 13	Davis Creek	NE.	21	8	25	3	....do	3.5
Aug. 19	Frenchman River	.....	31	6	21	3	....do	13.84
Sept. 17	....do	.....	3	1	10	3	P. M. Sander	4.76
Aug. 23	Frenchman River, north branch.	SE.	16	7	22	3	R. J. Burley	5.45
23	....do	SE.	16	7	22	3	....do	5.33
Sept. 8	Fairwell Creek, west branch.	.....	9	8	23	3	F. T. Fletcher	.87
8	Fairwell Creek, east branch.	.....	..	8	23	3	....do	.89
8	....do	.....	..	8	23	3	....do	.40
12	Lonepine Creek	.....	14	7	26	3	....do	*a*.38
Aug. 23	Spring Creek	.....	18	7	22	3	....do	.12
Sept. 8	Warlodge Creek, branch of.	.....	14	7	27	3	....do	*a*.22
21	Watson's Coulee	.....	7	7	21	3	P. A. Sander	*a*.08
1910.								
June 7	Creek (spring)	.....	20	6	27	3	F. T. Fletcher	.18
May 25	Frenchman River	SE.	5	1	10	3	F. H. Peters	42.48
Aug. 2	....do	NE.	20	6	22	3	R. J. Burley	4.21
3	....do	NE.	20	6	22	3	....do	2.50
6	....do	NE.	20	6	22	3	....do	5.13
10	....do	NE.	20	6	22	3	....do	8.08
3	....do	SE.	28	6	21	3	....do	.40
6	....do	SE.	28	6	21	3	....do	.60
8	....do	SE.	28	6	21	3	....do	.54
11	....do	SE.	28	6	21	3	....do	.50
16	....do	SE.	28	6	21	3	....do	1.17
July 14	Morrison Bros.' ditch	SW.	26	6	21	3	R. G. Swan	.66
June 29	Warlodge Creek	.....	14	7	27	3	H. R. Carscallen	.10
1911.								
July 27	Breed Creek	NW.	12	4	12	3	N. M. Sutherland	0
May 16	Calf Creek	.....	5	8	22	3	G. H. Whyte	3.590
June 13	....do	.....	5	8	22	3	....do	1.360
Aug. 11	....do	.....	5	8	22	3	....do	1.448
Oct. 16	....do	.....	5	8	22	3	....do	1.510
May 17	Concrete Coulee	.....	11	7	23	3	....do	3.170
June 14	....do	.....	11	7	23	3	....do	1.190
July 12	....do	.....	11	7	23	3	....do	1.120
Aug. 12	....do	.....	11	7	23	3	....do	1.001
July 12	Creek	.....	35	3	12	3	N. M. Sutherland	0
13	....do	.....	14	2	12	3	....do	0
26	....do	.....	25	4	12	3	....do	0
Aug. 15	....do	.....	35	3	12	3	....do	0
15	....do	.....	35	2	12	3	....do	0
15	....do	.....	3	2	11	3	....do	0
July 11	A. M. Cross ditch	.....	5	8	22	3	G. H. Whyte	1.220
May 17	Doyle Coulee	.....	17	7	22	3	....do	.590
June 14	....do	.....	17	7	22	3	....do	.380
Sept. 13	....do	.....	17	7	22	3	G. R. Elliott	.371
June 16	Dip Creek	.....	7	8	25	3	G. H. Whyte	.182
17	Frenchman River	SW.	4	1	10	3	N. M. Sutherland	23.940
July 14	....do	SW.	4	1	10	3	....do	26.140

a Weir measurement.

Miscellaneous discharge measurements in Milk River drainage basin during 1900–1917—Continued.

Measurements made by Canadian engineers—Continued.

Frenchman River and tributaries—Continued.

Date.	Stream.	Locality.					Hydrographer.	Discharge.
		Quarter.	Sec.	T.	R. W.	Mer.		
1911.								*Sec.-ft.*
Aug. 16	Frenchman River	SW...	4	1	10	3	N. M. Sutherland	1.650
2	do	NE...	28	5	17	3	G. H. Whyte	4.470
Sept. 14	do	NE...	28	5	17	3	H. T. Thomas	37.510
Aug. 3	do	.....	26	6	21	3	G. H. Whyte	5.760
3	do	.....	5	6	20	3	do	8.040
27	North branch of Frenchman River.	NW...	16	8	22	3	G. R. Elliott	2.180
Sept. 6	do	NW...	15	7	22	3	R. J. Burley and F. T. Fletcher.	54.100
Aug. 14	Spring Creek	.....	28	7	24	3	G. H. Whyte	.706
Sept. 13	do	.....	18	7	22	3	G. R. Elliott	.314
14	do	SW...	7	6	16	3	R. J. Burley and G. H. Whyte.	.389
25	do	NE...	23	6	24	3	F. T. Fletcher	.064
July 12	Snake Creek	SE...	33	3	13	3	N. M. Sutherland	0
27	do	SE...	33	3	13	3	do	0
Aug. 13	do	SE...	33	3	13	3	do	0
1912.								
June 11	Barnett's ditch	.....	17	7	22	3	J. S. Wright	.41
July 9	do	.....	17	7	22	3	do	.39
May 18	Calf Creek	.....	5	8	22	3	do	1.51
June 10	do	.....	5	8	22	3	do	1.81
July 8	do	.....	5	8	22	3	do	.064
Aug. 5	do	.....	5	8	22	3	do	1.03
Sept. 5	do	.....	5	8	22	3	do	1.36
24	do	.....	5	8	22	3	do	1.59
Oct. 29	do	.....	5	8	22	3	do	1.91
July 9	Concrete Coulee	.....	11	7	23	3	do	.49
Aug. 6	do	.....	11	7	23	3	do	1.33
Sept. 6	do	.....	11	7	23	3	do	1.64
Oct. 11	do	.....	11	7	23	3	do	1.88
July 8	H. Cross' ditch	.....	5	8	22	3	do	1.75
Aug. 5	do	.....	5	8	22	3	do	.80
Sept. 5	do	.....	5	8	22	3	do	.46
24	do	.....	5	8	22	3	do	.81
Oct. 29	do	.....	5	8	22	3	do	0
June 11	Doyle Coulee	.....	17	7	22	3	do	.47
July 9	do	.....	17	7	22	3	do	.065
Aug. 6	do	.....	17	7	22	3	do	.167
Sept. 6	do	.....	17	7	22	3	do	.4245
Oct. 11	do	.....	17	7	22	3	do	.645
July 5	Frenchman	NE...	21	5	17	3	do	32.33
Aug. 30	do	NE...	21	5	17	3	do	15.17
Nov. 6	do	NE...	21	5	17	3	do	21.5
Aug. 8	do	NE...	22	6	25	3	do	5.17
July 9	Pearse's ditch	.....	11	7	23	3	do	.36
Aug. 29	Spring Creek	SW...	7	6	16	3	do	.70
1913.								
Apr. 18	Blacktail Creek	NE...	30	6	23	3	J. S. Wright and E. W. W. Hughes.	1.31
25	Calf Creek	.....	4	8	22	3	E. W. W. Hughes	1.65
May 10	do	.....	4	8	22	3	do	1.62
June 14	do	.....	4	8	22	3	do	1.52
July 15	do	.....	4	8	22	3	do	1.70
Oct. 11	do	.....	4	8	22	3	do	1.20
May 16	Concrete Coulee	NW...	2	7	23	3	do	2.31
June 18	do	NW...	2	7	23	3	do	1.57
July 17	do	NW...	2	7	23	3	do	.99
Aug. 22	do	NW...	2	7	23	3	do	1.14
May 21	Cypress Lake overflow	SE...	24	6	26	3	do	2.21
June 23	do	SE...	24	6	26	3	do	1.22
July 26	do	SE...	24	6	26	3	do	.72
Sept. 2	do	SE...	24	6	26	3	do	.01
June 18	Doyle Coulee	SE...	17	7	22	3	do	.36
Aug. 22	do	SE...	17	7	22	3	do	.18
Sept. 21	do	SE...	17	7	22	3	do	.19
June 20	Dry Coulee	NW...	16	6	24	3	do	6.46
11	Frenchman River	.....	21	5	17	3	do	15.70
11	Mule Creek	SE...	31	5	17	3	do	.64
18	S. Pearse's ditch	NW...	2	7	23	3	do	.75

Miscellaneous discharge measurements in Milk River drainage basin during 1900–1917—Continued.

Measurements made by Canadian engineers—Continued.

Frenchman River and tributaries—Continued.

Date.	Stream.	Locality.					Hydrographer.	Discharge.
		Quarter.	Sec.	T.	R. W.	Mer.		
1913.								*Sec.ft.*
May 16	Petrified Coulee	NE...	7	20	22	3	E. W. W. Hughes	0.62
June 18	do	NE...	7	20	22	3	do	.95
Aug. 22	do	NE...	7	20	22	3	do	.21
Sept. 24	do	NE...	7	20	22	3	do	.62
May 28	Rocky Creek	SE...	6	8	27	3	H. R. Carscallen	.29
Aug. 12	Spring Creek	NE...	7	7	22	3	P. V. Binns	.17
1914.								
Mar. 17	Blacktail Creek	.....	30	6	23	3	M. H. French	0
June 27	do	.....	30	6	23	3	F. R. Steinberger	0
Mar. 17	Concrete Coulee	.....	2	7	23	3	M. H. French	0
Apr. 7	do	.....	2	7	23	3	F. R. Steinberger	2.20
June 26	do	.....	2	7	23	3	do	.13
Aug. 7	do	.....	2	7	23	3	do	.13
June 20	Calf Creek	SE...	5	8	22	3	do	.14
Sept. 14	do	SE...	5	8	22	3	E. W. W. Hughes	2.90
May 7	Doyle Coulee	SE...	17	7	22	3	F. R. Steinberger	.22
June 26	do	SE...	17	7	22	3	do	.16
July 20	do	SE...	17	7	22	3	do	.09
Aug. 7	do	SE...	17	7	22	3	do	.08
Mar. 25	Frenchman River	.....	25	6	22	3	M. H. French	28.00
31	do	.....	25	6	22	3	do	44.00
Apr. 1	do	.....	25	6	22	3	do	45.00
3	do	.....	25	6	22	3	do	168.00
3	do	.....	25	6	22	3	do	94.00
4	do	.....	25	6	22	3	do	238.00
5	do	.....	25	6	22	3	do	399.00
6	do	.....	25	6	22	3	do	463.00
11	do	.....	25	6	22	3	do	265.00
14	do	.....	25	6	22	3	do	259.00
Oct. 17	do	NW...	19	6	23	3	E. W. W. Hughes	9.70
May 9	Overflow of Cypress Lake	SE...	24	6	25	3	F. R. Steinberger	.72
June 29	do	SE...	24	6	25	3	do	.14
July 22	do	SE...	24	6	25	3	do	0
Aug. 12	do	SE...	24	6	25	3	do	0
June 26	Pearse's ditch	.....	2	7	21	3	do	1.26
May 7	Petrified Coulee	.....	7	7	22	3	do	.62
June 26	do	.....	7	7	22	3	do	.14
July 20	do	.....	7	7	22	3	do	.11
Aug. 7	do	.....	7	7	22	3	do	.06
1916.								
May 10	Blacktail Creek	NW...	20	6	23	3	J. E. Caughey	[a]1.53
June 9	do	NW...	20	6	23	3	do	[a]1.02
July 10	do	NW...	20	6	23	3	do	[a].62
Sept. 1	do	NW...	20	6	23	3	L. B. P. Miles	[a].33
Oct. 13	do	NW...	20	6	23	3	do	[a].16
Nov. 3	do	NW...	20	6	23	3	do	[a].25
Mar. 28	Buzzard's ditch	NW...	11	2	11	3	J. E. Caughey	62.00
29	do	NW...	11	2	11	3	do	69.00
Apr. 4	do	NW...	11	2	11	3	do	62.00
6	do	NW...	11	2	11	3	do	47.00
7	do	NW...	11	2	11	3	do	47.00
8	do	NW...	11	2	11	3	do	47.00
13	do	NW...	11	2	11	3	do	89.00
14	do	NW...	11	2	11	3	do	98.00
17	do	NW...	11	2	11	3	do	46.00
May 9	Calf Creek	SE...	5	8	22	3	do	1.71
June 7	do	SE...	5	8	22	3	do	1.46
July 24	do	SE...	5	8	22	3	L. B. P. Miles	1.07
Aug. 29	do	SE...	5	8	22	3	do	[a]1.13
May 10	Concrete Coulee	NW...	2	7	23	3	J. E. Caughey	2.50
June 8	do	NW...	2	7	23	3	do	1.52
July 10	do	NW...	2	7	23	3	do	1.44
25	do	NW...	2	7	23	3	do	1.06
Aug. 31	do	NW...	2	7	23	3	L. B. P. Miles	[a].72
Nov. 3	do	NW...	2	7	23	3	do	[a]1.37
May 10	Doyle Coulee	SW...	17	7	22	3	do	[a].50
June 8	do	SW...	17	7	22	3	do	.80
July 10	do	SW...	17	7	22	3	do	[a].27
25	do	SW...	17	7	22	3	do	[a].24

[a] Weir measurement.

Miscellaneous discharge measurements in Milk River drainage basin during 1900–1917—Continued.

Measurements made by Canadian engineers—Continued.

Frenchman River and tributaries—Continued.

Date.	Stream.	Locality.					Hydrographer.	Discharge.
		Quarter.	Sec.	T.	R. W.	Mer.		
1916.								*Sec.ft.*
Aug. 31	Doyle Coulee	SW	17	7	22	3	L. B. P. Miles	[a]0.23
Nov. 3	do	SW	17	7	22	3	do	[a].43
Apr. 24	East branch Snake Creek	NW	21	4	12	3	J. E. Caughey	.47
May 19	do	NW	21	4	12	3	do	0
31	do	NW	21	4	12	3	do	1.10
June 26	do	NW	21	4	12	3	do	[a].04
Aug. 8	do	NW	21	4	12	3	L. B. P. Miles	0
14	do	NW	21	4	12	3	do	0
Sept. 10	do	NW	21	4	12	3	do	0
16	do	NW	21	4	12	3	do	0
Nov. 15	do	NW	21	4	12	3	do	0
May 19	Fireguard Creek	SE	5	3	11	3	J. E. Caughey	0
June 26	do	SE	5	3	11	3	do	[a].02
Aug. 9	do	SE	5	3	11	3	L. B. P. Miles	0
14	do	SE	5	3	11	3	do	0
Sept. 10	do	SE	5	3	11	3	do	0
16	do	SE	5	3	11	3	do	0
Nov. 15	do	SE	5	3	11	3	do	0
May 30	Little Pinto Creek	SE	2	4	12	3	J. E. Caughey	13.60
June 26	do	SE	2	4	12	3	do	[a].08
Aug. 9	do	SE	2	4	12	3	L. B. P. Miles	[a].08
14	do	SE	2	4	12	3	do	[a].08
Sept. 10	do	SE	2	4	12	3	do	[a].08
16	do	SE	2	4	12	3	do	[a].08
Nov. 15	do	SE	2	4	12	3	do	[a].08
May 10	Petrified Coulee	SE	18	7	22	3	J. E. Caughey	[a].28
June 8	do	SE	18	7	22	3	do	[a].56
July 10	do	SE	18	7	22	3	do	[a].38
25	do	SE	18	7	22	3	do	[a].18
Aug. 31	do	SE	18	7	22	3	L. B. P. Miles	[a].21
Nov. 3	do	SE	18	7	22	3	do	[a].28
May 30	Police Creek	SW	30	3	11	3	J. E. Caughey	6.10
June 26	do	SW	30	3	11	3	do	[a].08
Aug. 9	do	SW	30	3	11	3	L. B. P. Miles	0
14	do	SW	30	3	11	3	do	0
Sept. 10	do	SW	30	3	11	3	do	0
16	do	SW	30	3	11	3	do	0
Nov. 15	do	SW	30	3	11	3	do	0
June 8	Rose Creek	NE	26	7	22	3	J. E. Caughey	[a].94
Oct. 27	do	NE	26	7	22	3	L. B. P. Miles	[a].94
May 18	Shotgun Creek	NW	21	4	14	3	J. E. Caughey	0
June 1	do	NW	21	4	14	3	do	1.34
27	do	NW	21	4	14	3	do	[a].06
Aug. 7	do	NW	21	4	14	3	L. B. P. Miles	0
15	do	NW	21	4	14	3	do	0
Sept. 9	do	NW	21	4	14	3	do	0
16	do	NW	21	4	14	3	do	0
Nov. 14	do	NW	21	4	14	3	do	0
1915.								
Mar. 30	Belanger Creek	SW	30	6	25	3	M. H. French	24.000
Apr 12	do	SW	30	6	25	3	do	13.600
July 15	Blacktail Creek	NW	20	6	23	3	J. E. Caughey	.282
Aug. 5	do	NW	20	6	23	3	do	.282
25	do	NW	20	6	23	3	do	.239
Sept. 25	do	NW	20	6	23	3	do	.428
Oct. 14	do	NW	20	6	23	3	do	.332
28	do	NW	20	6	23	3	do	.302
Apr. 22	Bluff Creek	SE	10	2	9	3	F. R. Steinberger	.058
July 12	Calf Creek	SE	5	8	22	3	J. E. Caughey	1.310
Aug. 4	do	SE	5	8	22	3	do	1.700
24	do	SE	5	8	22	3	do	1.050
Sept. 24	do	SE	5	8	22	3	do	.919
Oct. 13	do	SE	5	8	22	3	do	1.320
July 13	Concrete Coulee	NW	2	7	23	3	do	.998
Aug. 4	do	NW	2	7	23	3	do	.494
25	do	NW	2	7	23	3	do	.836
Sept. 25	do	NW	2	7	23	3	do	1.090
Oct. 14	do	NW	2	7	23	3	do	1.134
28	do	NW	2	7	23	3	do	1.178
July 13	Doyle Coulee	SW	17	7	22	3	do	.520

[a] Weir measurement.

Miscellaneous discharge measurements in Milk River drainage basin during 1900–1917—Continued.

Measurements made by Canadian engineer —Continued.

Frenchman River and tributaries—Continued.

Date.	Stream.	Locality.					Hydrographer.	Discharge.
		Quarter.	Sec.	T.	R.	W. Mer.		
1915								*Sec.-ft.*
Aug. 4	Doyle Coulee	SW	17	7	22	3	J. E. Caughey	0.420
25	do	SW	17	7	22	3	do	.217
Sept. 25	do	SW	17	7	22	3	do	.302
Oct. 14	do	SW	17	7	22	3	do	.302
28	do	SW	17	7	22	3	do	.332
Apr. 12	Frenchman River	SE	19	6	25	3	M. H. French	3.000
July 16	do	SE	19	6	25	3	J. E. Caughey	2.300
Aug. 6	do	SE	19	6	25	3	do	.399
27	do	SE	19	6	25	3	do	.039
Sept. 28	do	SE	19	6	25	3	do	.302
Oct. 18	do	SE	19	6	25	3	do	.028
29	do	SE	19	6	25	3	do	.015
Mar. 18	do	SE	32	6	21	3	M. H. French	19.200
19	do	SE	32	6	21	3	do	17.200
20	do	SE	32	6	21	3	do	19.800
21	do	SE	32	6	21	3	do	26.000
24	do	SE	32	6	21	3	do	134.000
26	do	SE	32	6	21	3	do	55.000
29	do	NW	25	6	22	3	do	40.000
Apr. 19	do	NW	25	6	22	3	do	86.000
19	do	NW	25	6	22	3	do	70.000
May 24	do		14	4	14	3	F. R. Steinberger	53.000
June 3	do		14	4	14	3	do	65.000
22	do		14	4	14	3	do	43.000
Aug. 18	do		14	4	14	3	do	24.000
27	do		14	4	14	3	do	25.000
Sept. 11	do		14	4	14	3	do	35.000
July 31	do		14	4	14	3	do	53.000
Mar. 27	North Branch of Frenchman River.	NE	16	7	22	3	M. H. French	11.600
May 1	Fireguard Creek	SW	9	3	11	3	F. R. Steinberger	.....
June 9	Littlebreed Creek		2	3	10	3	do	.140
15	do		2	3	10	3	do	.100
July 12	do		2	3	10	3	do	.101
19	do		2	3	10	3	do	1.060
29	do		2	3	10	3	do	.726
Aug. 5	do		2	3	10	3	do	.051
12	do		2	3	10	3	do	.....
June 12	East branch of McEachran Creek.	SE	6	1	7	3	do	.....
Apr. 22	Molestead Coulee		12	2	10	3	do	0
July 30	Mule Creek	SE	27	5	17	3	do	.762
Aug. 21	do	SE	27	5	17	3	do	.327
June 10	Ogne Coulee		28	1	8	3	do	.216
14	do		28	1	8	3	do	.169
July 19	do		28	1	8	3	do	.126
Aug. 6	do		28	1	8	3	do	.....
11	do		28	1	8	3	do	.....
Apr. 22	Otter Coulee	SW	1	2	10	3	do	0
July 13	Petrified Coulee	SE	18	7	22	3	J. E. Caughey	.349
Aug. 4	do	SE	18	7	22	3	do	.303
25	do	SE	18	7	22	3	do	.161
Sept. 25	do	SE	18	7	22	3	do	.219
Oct. 14	do	SE	18	7	22	3	do	.180
28	do	SE	18	7	22	3	do	.260
May 1	Police Creek	NW	12	4	12	3	F. R. Steinberger	0
June 5	do	NW	12	4	12	3	do	.120
18	do	NW	12	4	12	3	do	.224
July 9	do	NW	12	4	12	3	do	.193
Aug. 3	do	NW	12	4	12	3	do	0
6	do	NW	12	4	12	3	do	.....
June 2	Shotgun Coulee	NE	21	4	14	3	do	2.040
July 25	do		14	4	14	3	do	.236

LIST OF GAGING STATIONS.

NOTE.—Dash after a date indicates that station was being maintained Dec. 31, 1917. Period after a date indicates discontinuance.

St. Mary River basin:

Stations on main stream:

St. Mary River near Babb, Mont., 1902–
St. Mary River below Swiftcurrent Creek, at Babb, Mont., 1901–2; 1910–1915.
St. Mary River at Cook's ranch, Alta., near international boundary, 1902–1912.
St. Mary River near Kimball, Alta., near international boundary, 1908–
St. Mary River near Lethbridge, Alta., 1911–

Stations on tributaries:

Swiftcurrent Creek at Many Glacier, Mont., 1912–
Swiftcurrent Creek below Sherburne Lake dam, Mont., 1912–
Swiftcurrent Creek near Babb, Mont., 1902–1910.
Kennedy Creek near Babb, Mont., 1903–1912.
Boundary Creek at Fidler's ranch, Alta., 1913–
Rolph Creek near Taylorville, Alta., 1917–
Rolph Creek near Kimball, Alta., 1911–1916.
Lee Creek at Layton's ranch, Alta., 1913–
Lee Creek at Cardston, Alta., 1909–1914.
Pinepound Creek near Spring Coulee, Alta., 1914–
Pothole Creek near Magrath, Alta., 1914–
Pothole Creek, lower station, near Magrath, Alta., 1914–

Stations on canals:

U. S. Reclamation Service St. Mary canal at Hudson Bay divide, near Browning, Mont., 1917–
Fidler Brothers' ditch at Boundary Creek, Alta., 1911–1914; 1917–
Alberta Railway & Irrigation Co.'s canal at Kimball, Alta., 1910–
Alberta Railway & Irrigation Co.'s canal near Kimball, Alta., 1910–1916.
Alberta Railway & Irrigation Co.'s canal at Spring Coulee, Alta., 1914–

Milk River basin:

Stations on main stream:

South Fork of Milk River near International boundary, 1905–
South Fork of Milk River at Mackie's ranch, Alta., 1910–1915.
Milk River at Milk River, Alta., 1909–
Milk River at Writing-on-Stone, Police Detachment, Alta., 1909–1915.
Milk River at Pendant d'Oreille, Police Detachment, Alta., 1909–1915.
Milk River at eastern crossing of international boundary, 1909–
Milk River at Havre, Mont., 1898–
Milk River at Chinook, Mont., 1897.
Milk River at Malta, Mont., 1902–
Milk River at Hinsdale, Mont., 1908–1914.
Milk River at Vandalia, Mont., 1915–

Stations on tributaries:

North Fork of Milk River near Browning, Mont., 1911–12.
North Fork of Milk River near international boundary, 1909–
North Fork of Milk River at Knight's ranch, Alta., 1919–1914.
North Fork of Milk River at Mackie's ranch, Alta., 1909–1915.

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Lodge Creek at Hester's ranch, Alta., 1912–1914.
Lodge Creek at international boundary, 1910–
Lodge Creek near Chinook, Mont., 1906–1908.
Thelma Creek at English's ranch near Thelma, Alta., 1911–
Middle Creek at MacKinnon's ranch, Alta., 1910–1915.
Middle Creek at Ross's ranch, Sask., 1909–
Middle Creek at Hammond's ranch, Sask., 1911–
Battle Creek at Tenmile Police Detachment, Sask., 1909–
Battle Creek at Wilkes's ranch, Sask., 1910–
Battle Creek at Stirling's ranch, Sask., 1909.
Battle Creek at Nash's ranch, Sask., 1910–
Battle Creek at international boundary, Sask., 1917–
Battle Creek near Chinook, Mont., 1905–
Sixmile Creek at Soderstrom's ranch, Sask., 1909–1911.
Sixmile Creek at Spangler's ranch, Sask., 1911–1916.
Tenmile Creek at Tenmile Police Detachment, Sask., 1909–1915.
Frenchman River near Belanger, Sask., 1916–
Frenchman River at Gordon's ranch, Sask., 1913–14.
Frenchman River at Phillip's ranch, Sask., 1912–
Frenchman River at Eastend, Sask., 1909–1916.
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Frenchman River at Huff's ranch, Sask., 1910–11.
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Sucker Creek at Gilchrist's ranch, Sask., 1909–
Belanger Creek at Garrison's ranch, Sask., 1909–1913.
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Lonepine Creek at Hewitt's ranch, Sask., 1909–1914.
Davis Creek at Drury's ranch, Sask., 1909–
Fairwell Creek at Drury's ranch, Sask., 1909–
Blacktail Creek at Garissere's ranch, Sask., 1909–1914.
North Branch of Frenchman River at Cross's ranch, Sask., 1908–
Rose Creek at Dorrell, Sask., 1911–1914.
Mule Creek at Gunn's ranch, Sask, 1914–1916.
Bate Creek at Bate's ranch, Sask., 1914–1916.
Denniel Creek near Val Marie, Sask., 1914–
Bigbreed Creek near Buzzard's ranch, Sask., 1914–1916.
Littlebreed Creek near Buzzard's ranch, Sask., 1914–1916.
Beaver Creek near Malta, Mont., 1917–
Beaver Creek near Saco, Mont., 1903–1912.
Beaver Creek overflow near Bowdoin, Mont., 1903–1906; 1908–1912.
Rock Creek near Barnard, Mont., 1914–
Rock Creek near Hinsdale, Mont., 1905–1907; 1912–
Horse Creek near Barnard, Mont., 1914–
McEachran Creek at McCoy's ranch, Sask., 1914–
East Branch of McEachran Creek at McCoy's ranch, Sask., 1916.
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Fort Belknap canal near Chinook, Mont., 1903–
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English ditch near Thelma, Alta., 1916–
Reser ditch near Chinook, Mont., 1905.
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Matheson canal near Chinook, Mont., 1905–
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PUBLICATIONS RELATING TO WATER SUPPLY.

UNITED STATES.

Numbers of United States Geological Survey water-supply papers containing results of stream measurements in Milk and St. Mary River basins, 1899–1916.

Year.	Hudson Bay and upper Mississippi River basins.	Missouri River basin.	Year.	Hudson Bay and upper Mississippi River basins.	Missouri River basin.
1899[a]	36	37,39	1909	265	266
1900[b]	49	49,52	1910	285	286
1901	66,75	66,75	1911	305	306
1902	85	84	1912	325	326
1903	100	99	1913	355	356
1904	130	130	1914	385	386
1905	171	172	1915	405	406
1906	207	208	1916	435	436
1907–8	245	246			

[a] Rating tables and index to Water-Supply Papers 35–39 contained in Water-Supply Paper 39. Tables of monthly discharge for 1899 in Twenty-first Annual Report, Part IV.

[b] Rating tables and index to Water-Supply Papers 47–52 contained in Water-Supply Paper 52. Tables of monthly discharge for 1900 in Twenty-second Annual Report, Part IV.

The Fifth Biennial Report of the State engineer of Montana for 1911–12 contains monthly summary tables of stream-flow data for Montana down to 1911. The sixth Biennial Report contains similar data for 1912 and 1913.

CANADA.

Stream-flow data collected in the basins of St. Mary and Milk rivers in Canada can be found in Reports of Hydrometric Surveys published by the Irrigation Branch (now Reclamation Service), Department of Interior, Canada. The reports are published on a calendar year basis for the years 1908 to 1916, one volume for each year. For 1917 and 1918 the results are given for the year ending September 30.

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MAP OF ST. MARY AND MILK RIVER DRAINAGE BASINS, SHOWING LOCATION OF GAGING STATIONS

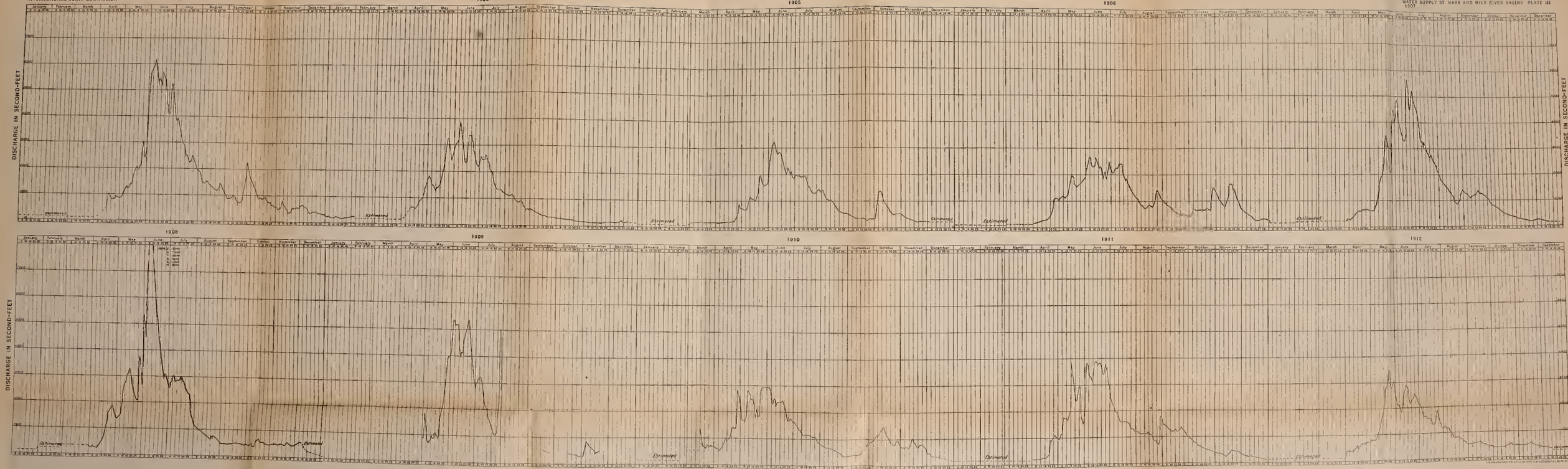
GAGING STATIONS

ST. MARY RIVER BASIN

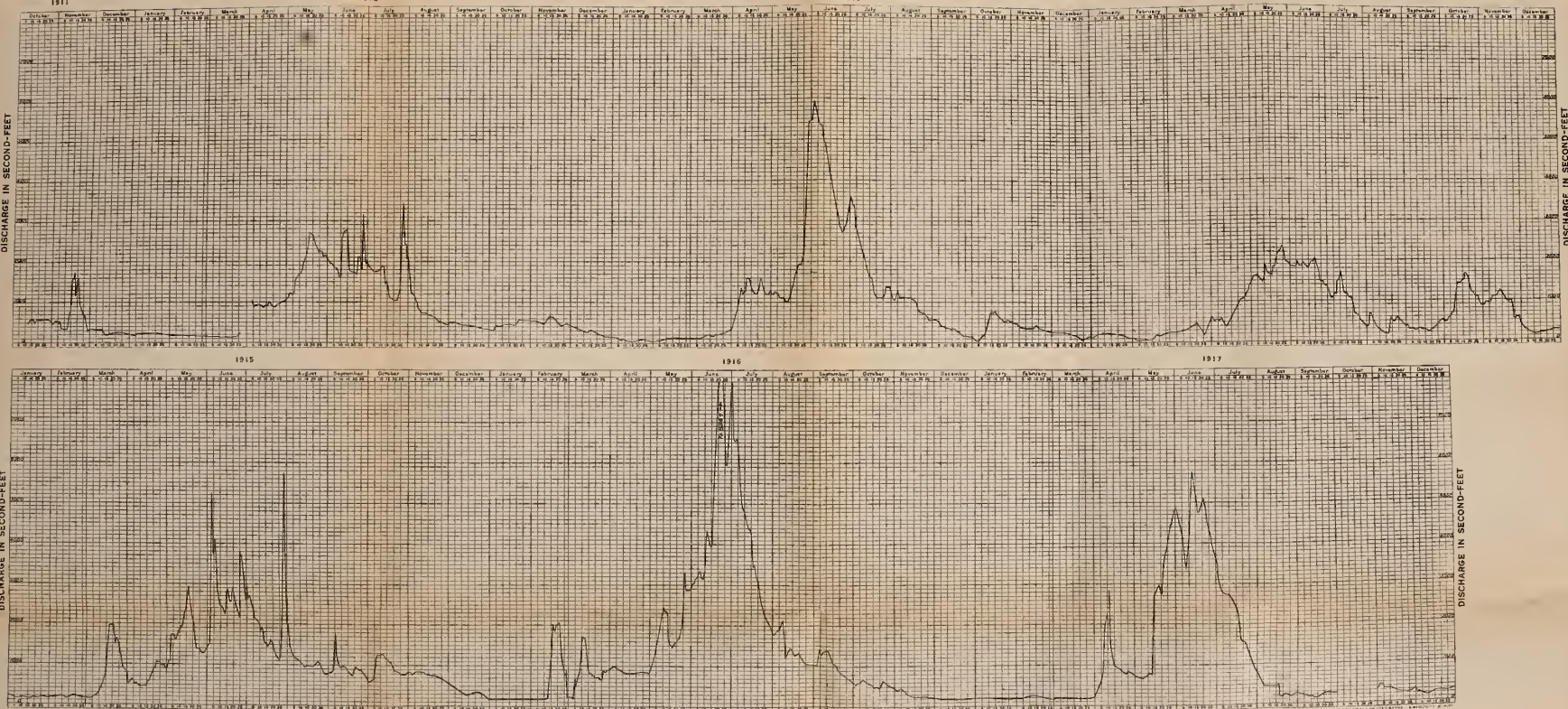
No.	Stream or canal	Location
1	St. Mary River	Basin, Mont.
2	St. Mary River	Babb, Mont., Kallow (Swiftcurrent Creek,
3	St. Mary River	Spring Coulee, Alta., near International boundary.
4	St. Mary River	Stafford Ridge, Alta.
5	St. Mary River	Lethbridge, Alta.
1A	Swiftcurrent Creek	Many Glacier, Mont.
2A	Swiftcurrent Creek	Sherbourne Lake, Mont.
3A	Swiftcurrent Creek	Babb, Mont.
4A	Kennedy Creek	Babb, Mont.
5A	Boundary Creek	Boundary Creek, Alta.
6A	Ralph Creek	Taylorville, Alta.
7A	Reign Creek	Kimball, Alta.
8A	Lee Creek	Leyton's ranch, Alta.
9A	Lee Creek	Cardston, Alta.
10A	Pakowki Creek	Boundary Creek, Alta.
11A	Pakowki Creek	Magrath, Alta.
12A	Pothole Creek, lower station	Magrath, Alta.
1B	U. S. R. S. No. 1 canal	Hudson Bay Divide, near Browning, Mont.
2B	Frisby Brook ditch	Boundary Creek, Alta.
3B	Alberta Railway & Irrigation Co.'s Canal	Kimball, Alta.
4B	Alberta Railway & Irrigation Co.'s Canal	Ralph Creek Flume, Alta.
5B	Alberta Railway & Irrigation Co.'s Canal	Spring Coulee, Alta.

MILK RIVER BASIN

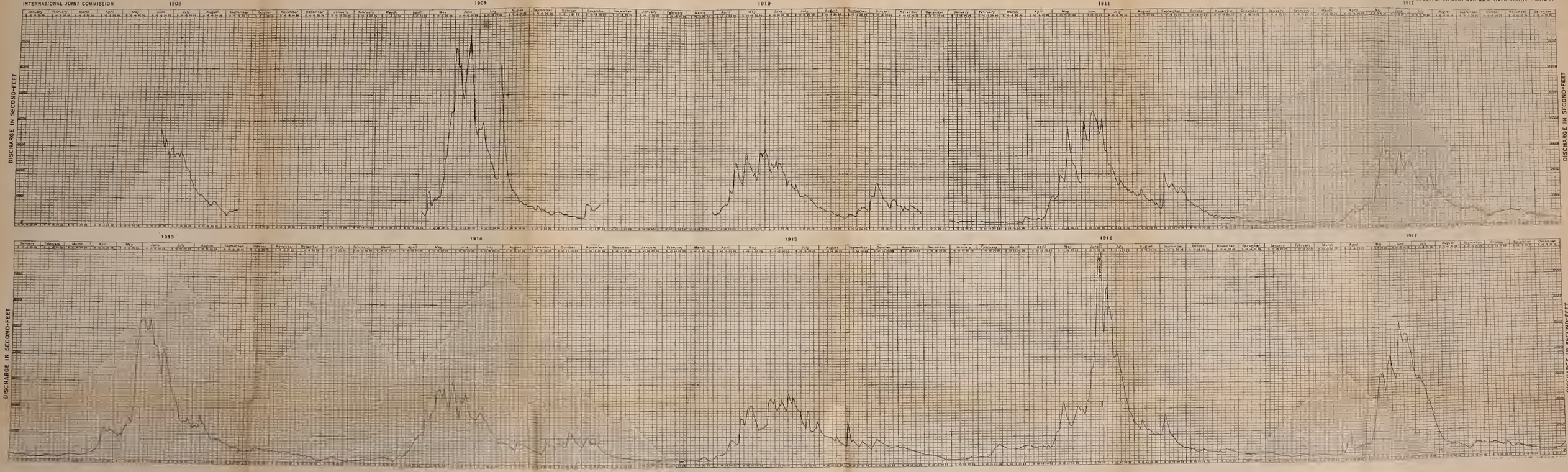
No.	Stream or canal	Location
6	South Fork of Milk River	International boundary.
7	South Fork of Milk River	Mackie's ranch, Alta.
8	Milk River	Milk River, Alta.
9	Milk River	Wellington-Dare, Alta.
10	Milk River	Pendant d'Oreille, Alta.
11	Milk River	Saskatchewan-Montana international boundary, Mont.
12	Milk River	Havre, Mont.
13	Milk River	Chinook, Mont.
14	Milk River	Harlem, Mont.
15	Milk River	Richards, Mont.
16	Milk River	Nashua, Mont.
17	North Fork of Milk River	Babb, Mont.
18A	North Fork of Milk River	International boundary.
19A	North Fork of Milk River	Knight's ranch, Alta.
20A	North Fork of Milk River	Mackie's ranch, Alta.
21A	Deer Creek	Dickinson's ranch, Alta.
22A	Lodge Creek	Hertz's ranch, Alta.
23A	Lodge Creek	Wild Horse, Alta.
24A	Lodge Creek	International boundary, Alta.
25A	Lodge Creek	Chinook, Mont.
26A	Three Creeks	English's ranch, Alta.
27A	Middle Creek	McKenzie's ranch, Alta.
28A	Middle Creek	Roerich, Sask.
29A	Middle Creek	Hamilton's ranch, Sask.
30A	Battle Creek	Government Experiment, Sask.
31A	Battle Creek	Wilson ranch, Sask.
32A	Battle Creek	Nash's ranch, Sask.
33A	Battle Creek	International boundary, Sask.
34A	Battle Creek	Chinook, Mont.
35A	Battle Creek	Hamilton's ranch, Sask.
36A	Battle Creek	Spangler's ranch, Sask.
37A	Battle Creek	Twomile Police Detachment, Sask.
38A	Frenchman River	Eastend, Sask.
39A	Frenchman River	Gordon's ranch, Sask.
40A	Frenchman River	Phillip's ranch, Sask.
41A	Frenchman River	Eastend, Sask.
42A	Frenchman River	Ravenscrag, Sask.
43A	Frenchman River	Hamilton's ranch, Sask.
44A	Frenchman River	Merlin's ranch, Sask.
45A	Frenchman River	International boundary.
46A	Dodrill Creek	Wylie's ranch, Sask.
47A	Dodrill Creek	Dodrill's ranch, Sask.
48A	Battle Lake Creek	Bannerman's ranch, Sask.
49A	Ballenger Creek	Cake's ranch, Sask.
50A	Longpine Creek	Hewitt's ranch, Sask.
51A	Davis Creek	Drury's ranch, Sask.
52A	Falwell Creek	Drury's ranch, Sask.
53A	Blackfoot Creek	Dunn's ranch, Sask.
54A	Frenchman River—Frenchman River	Cressy's ranch, Sask.
55A	Rose Creek	Dowell, Sask.
56A	Wolf Creek	Gunn's ranch, Sask.
57A	Eagle Creek	Bate's ranch, Sask.
58A	Dentist Creek	Val Marie, Sask.
59A	Eighteen Mile Creek	Government ranch, Sask.
60A	Snakeroot Creek	Near Gardiner, Sask.
61A	Willow Creek	Malta, Mont.
62A	Beaver Creek	Saco, Mont.
63A	Beaver Creek overflow	Dunkirk, Mont.
64A	Rock Creek	Saco, Mont.
65A	Rock Creek	Hinsdale, Mont.
66A	Rock Creek	Vandalia, Mont.
67A	McCarthy Creek	Chinook, Mont.
68A	East Branch of MacEachern Creek	McCarty ranch, Sask.
69A	Porcupine Creek	Nashua, Mont.
4B	Fort Belknap canal	Chinook, Mont.
5B	Winnebanbosh canal	Chinook, Mont.
6B	Peoples Valley canal	Zurich, Mont.
7B	Agency ditch	Zurich, Mont.
8B	Agency ditch	Harlem, Mont.
9B	Deer Creek Cattle Co.'s west ditch	St. Xites, Alta.
10B	Deer Creek Cattle Co.'s east ditch	St. Xites, Alta.
11B	Foothill ditch	St. Xites, Alta.
12B	Ft. Belknap north ditch	Fort Belknap, Mont.
13B	Ft. Belknap south ditch	Sage Butte, Alta.
14B	English ditch	Thelma, Alta.
15B	Fraser ditch	Chinook, Mont.
16B	West fork ditch	Chinook, Mont.
17B	Lindsay ditch	Battle Creek, Sask.
20B	Mansvelt and Gaff ditch	Battle Creek, Sask.
21B	Hall ditch	Battle Creek, Sask.
22B	Haney ditch	Battle Creek, Sask.
23B	Wilson ditch	Battle Creek, Sask.
24B	Gilchrist ditch	Consul, Sask.
25B	Richardson ditch	Consul, Sask.
26B	Jas. McKinnon ditch	Consul, Sask.
27B	Stirling and Nash ditch	Chinook, Mont.
28B	Hall ditch	Chinook, Mont.
29B	Mathesen canal	Chinook, Mont.
30B	Wood-Anderson ditch	Coulee, Sask.
31B	Sakaglan ditch	Battle Creek, Sask.
32B	Haney ditch	Frenchman River, Sask.
33B	Mountain ditch	Eastend, Sask.
34B	Mountain ditch	Eastend, Sask.
35B	Maple Creek Cattle Co.'s ditch	Orkney, Sask.
36B	F. Cress's ditch	Dowell, Sask.
37B	Sawyer ditch	Ravenscrag, Sask.
38B	A. M. Cress's ditch	Eastend, Sask.
39B	Dollingstone ditch	Bennett, Mont.
40B	Bloomy ditch	Hinsdale, Mont.
41B	Rock Creek canal	Hinsdale, Mont.



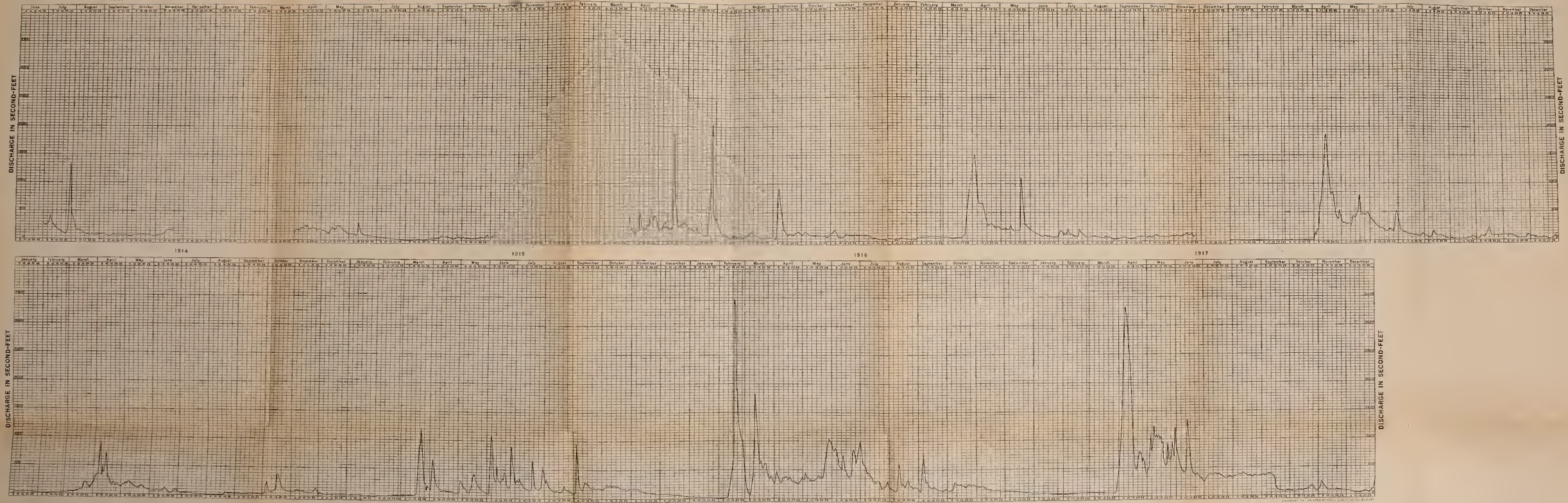
FLUCTUATIONS IN DISCHARGE OF ST. MARY RIVER AT COOK'S RANCH, NEAR INTERNATIONAL BOUNDARY, 1903-1912



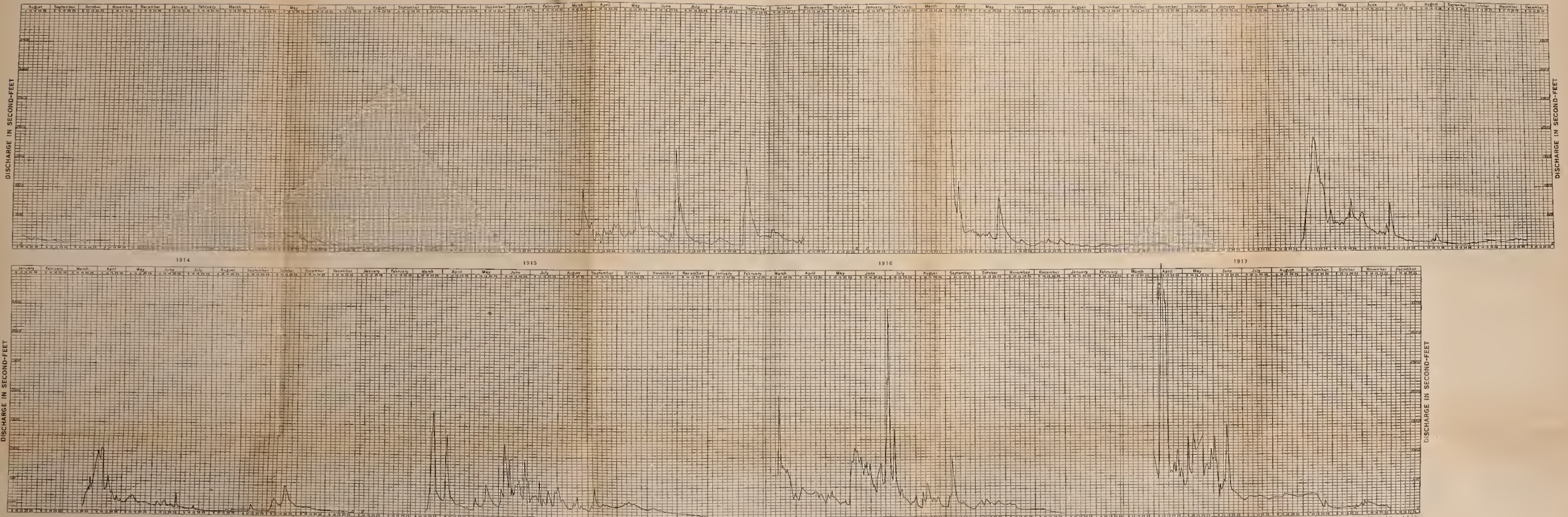
FLUCTUATIONS IN DISCHARGE OF ST. MARY RIVER NEAR LETHBRIDGE, ALTA., 1911-1917



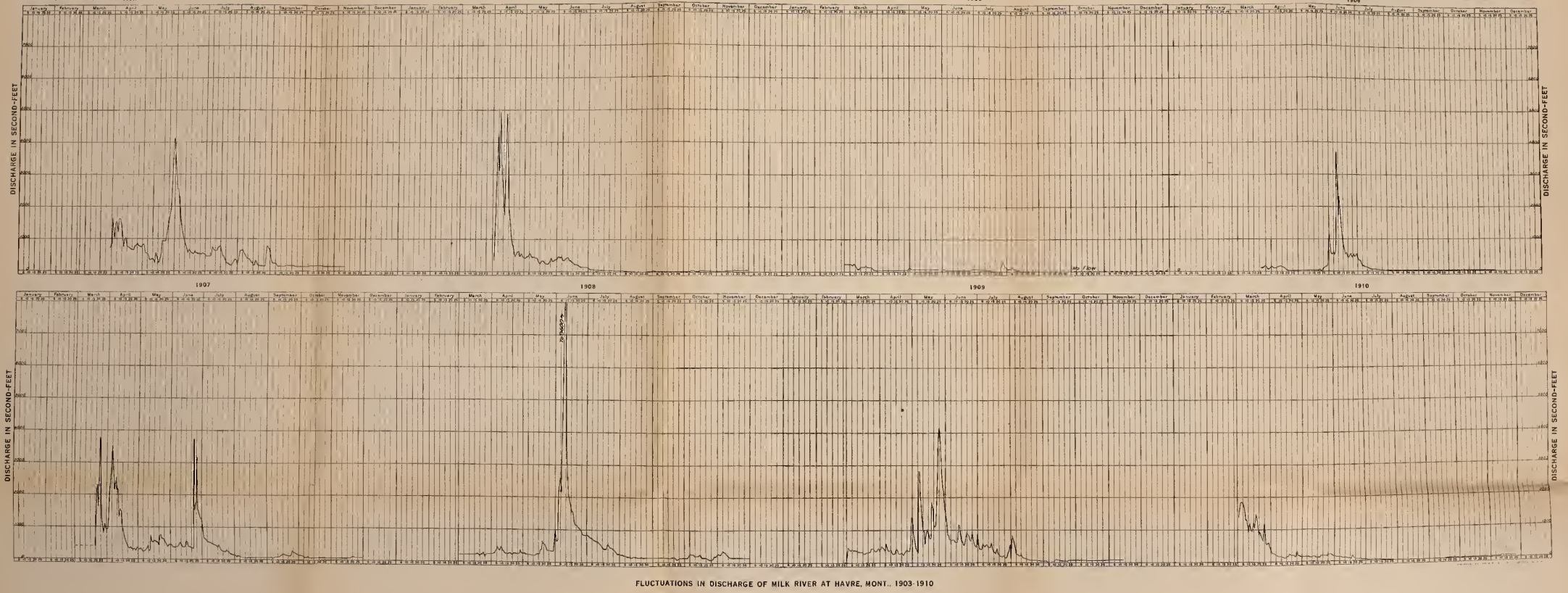
FLUCTUATIONS IN DISCHARGE OF ST. MARY RIVER NEAR KIMBALL, ALTA., AT INTERNATIONAL BOUNDARY, 1908-1917



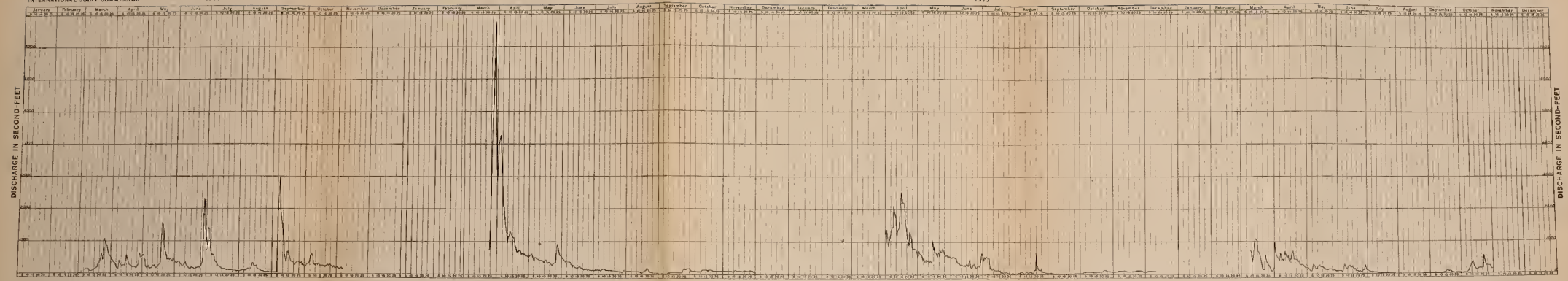
FLUCTUATIONS IN DISCHARGE OF MILK RIVER AT MILK RIVER, ALTA. 1909-1917

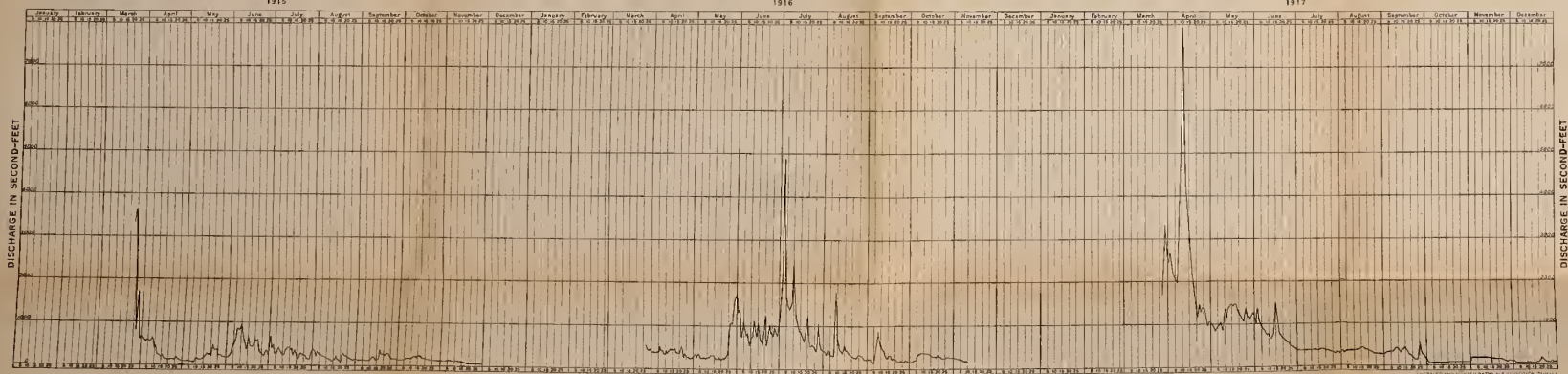


FLUCTUATIONS IN DISCHARGE OF MILK RIVER AT EASTERN CROSSING OF INTERNATIONAL BOUNDARY, 1909-1917



FLUCTUATIONS IN DISCHARGE OF MILK RIVER AT HAVRE, MONT., 1903-1910



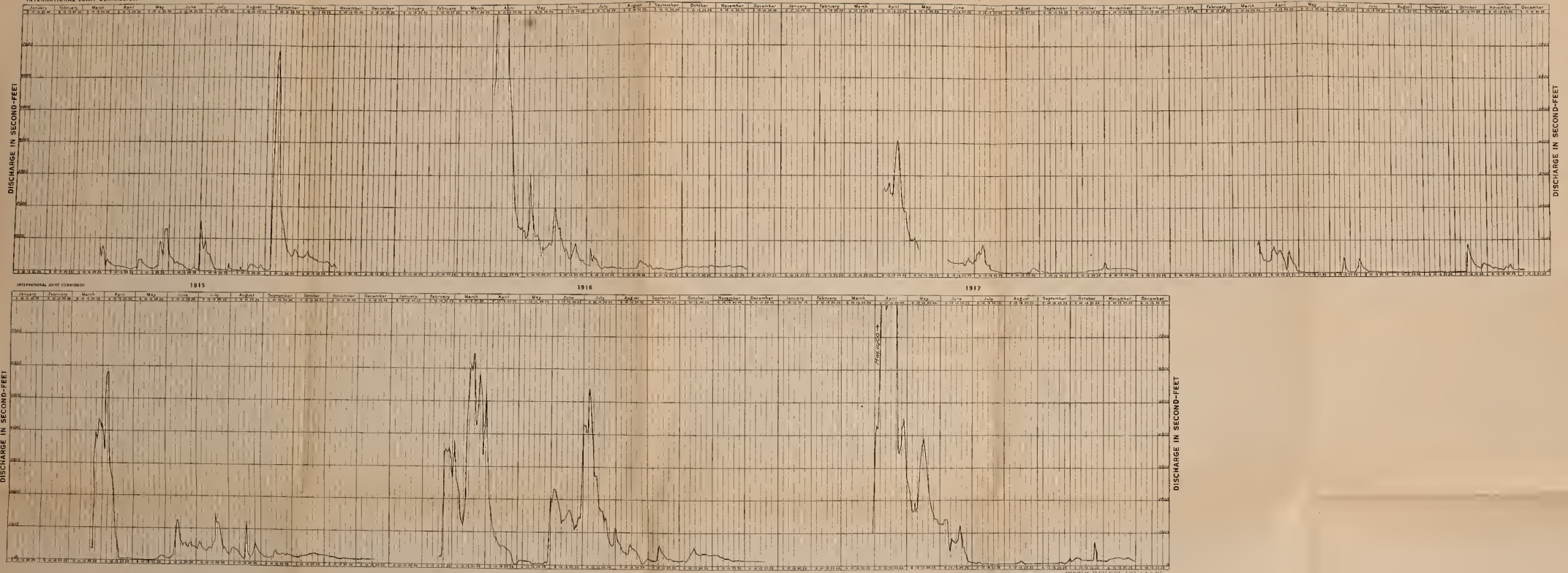


FLUCTUATIONS IN DISCHARGE OF MILK RIVER AT HAVRE, MONT., 1911-1917

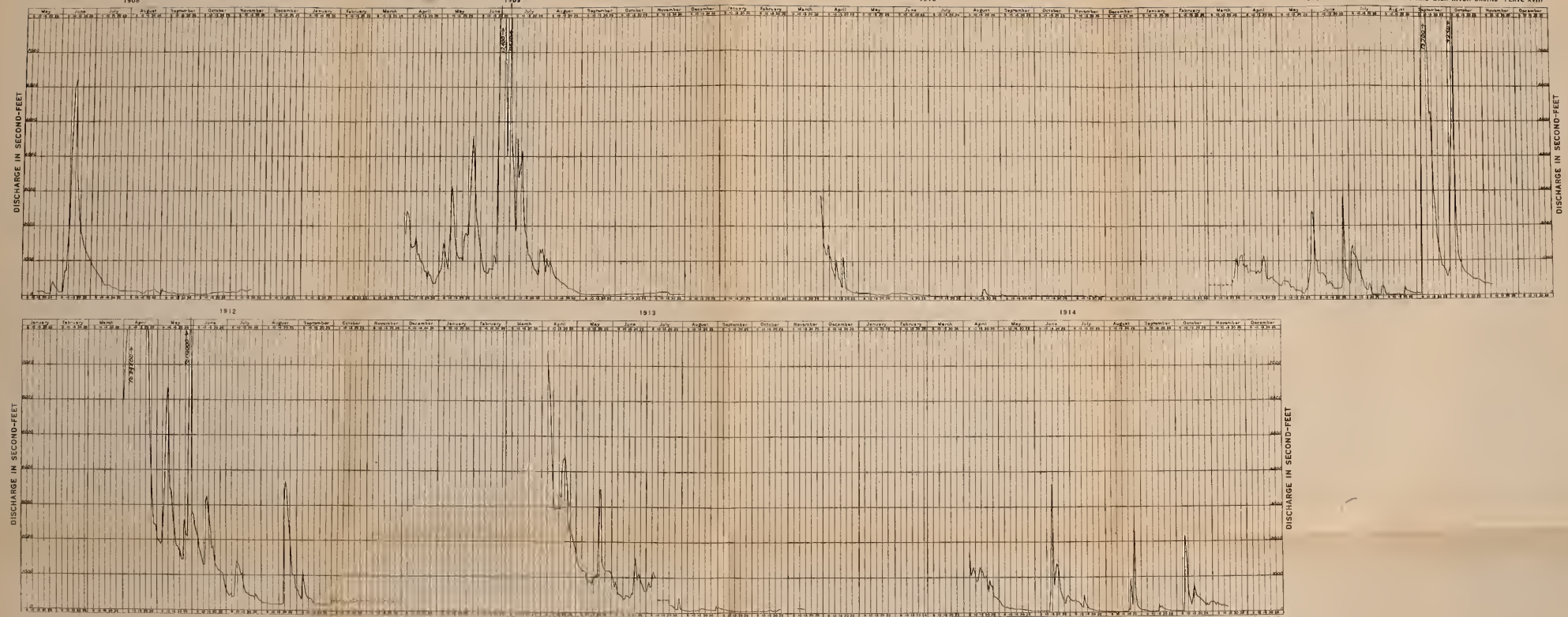
INTERNATIONAL JOINT COMMISSION

WATER SUPPLY ST MARY AND MILK RIVER BASINS PLATE XVI

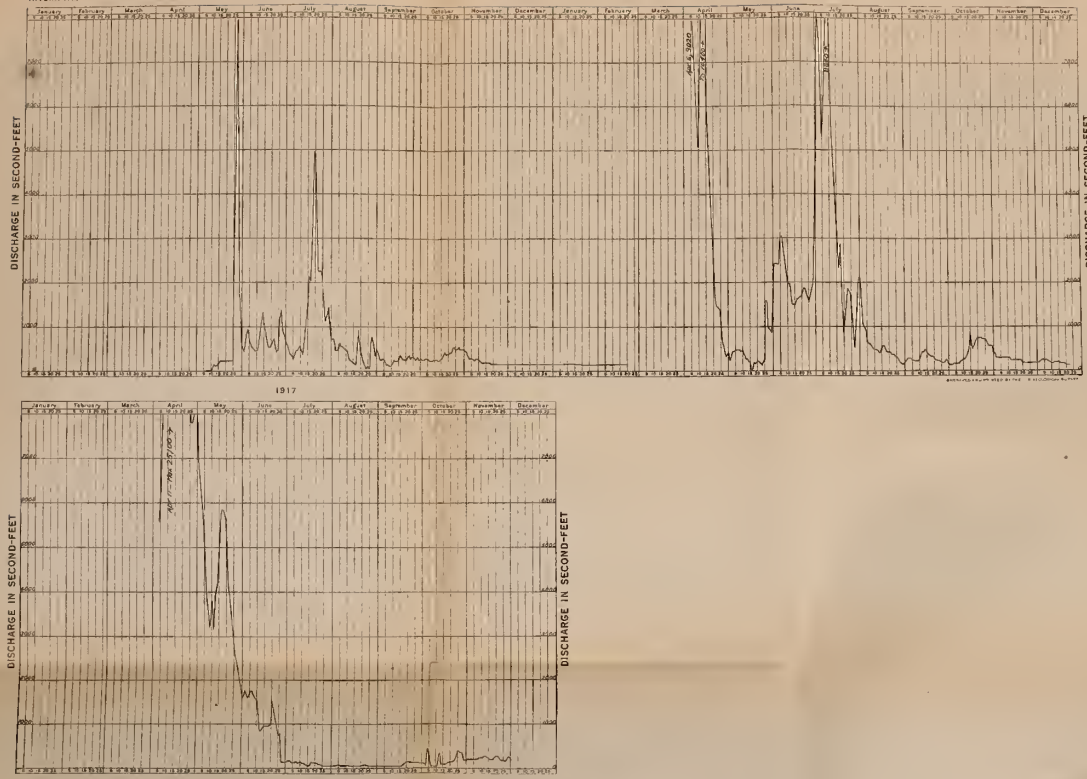
FLUCTUATIONS IN DISCHARGE OF MILK RIVER AT MALTA, MONT., 1903-1910



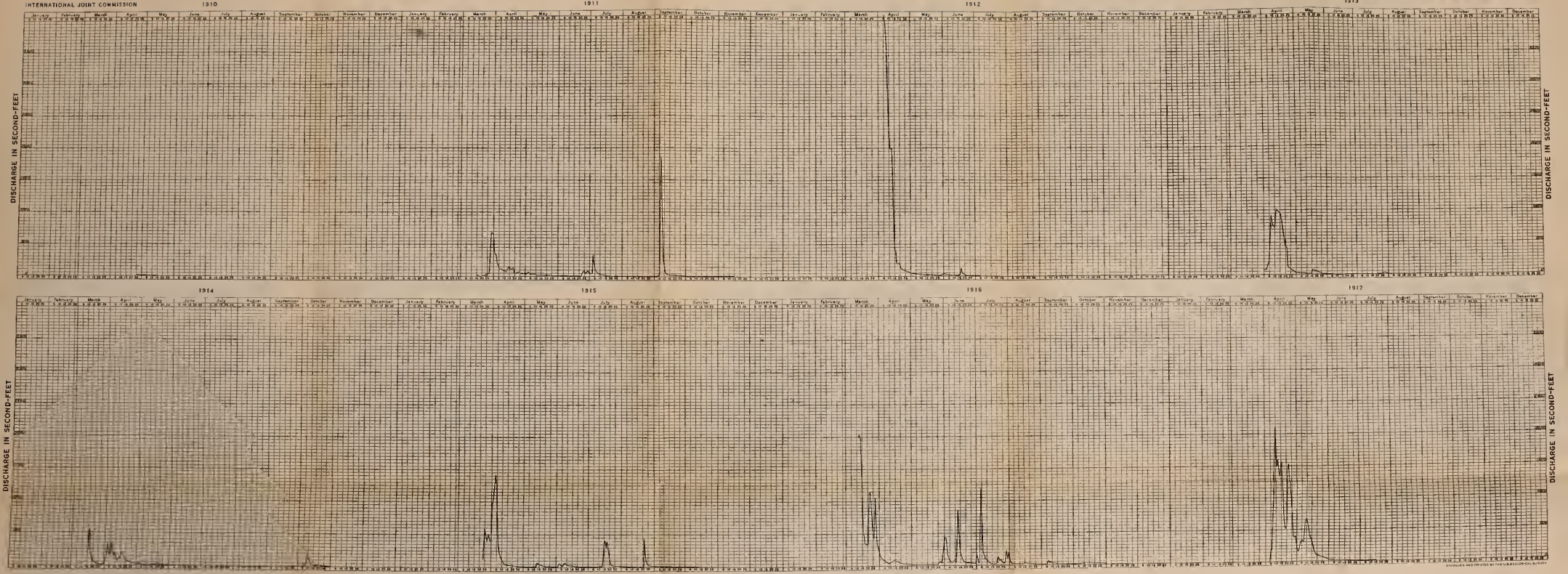
FLUCTUATIONS IN DISCHARGE OF MILK RIVER AT MALTA, MONT., 1911-1917



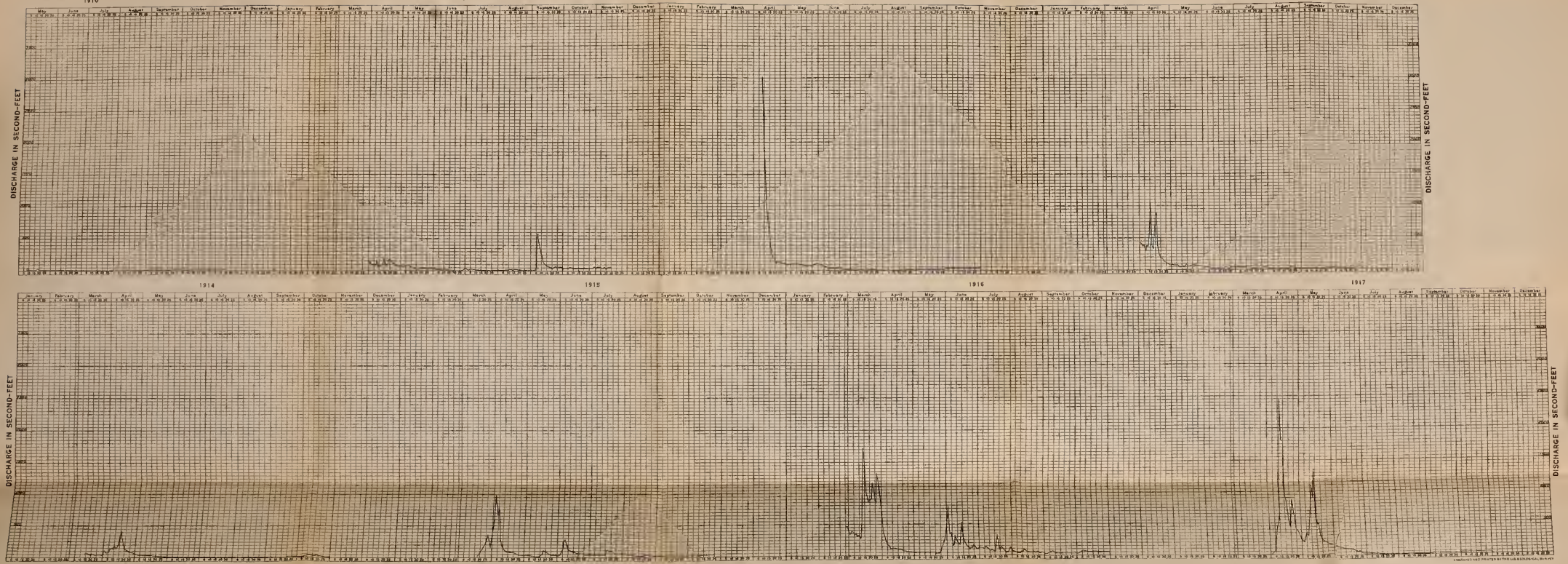
FLUCTUATIONS IN DISCHARGE OF MILK RIVER AT HINSDALE, MONT., 1908-1914



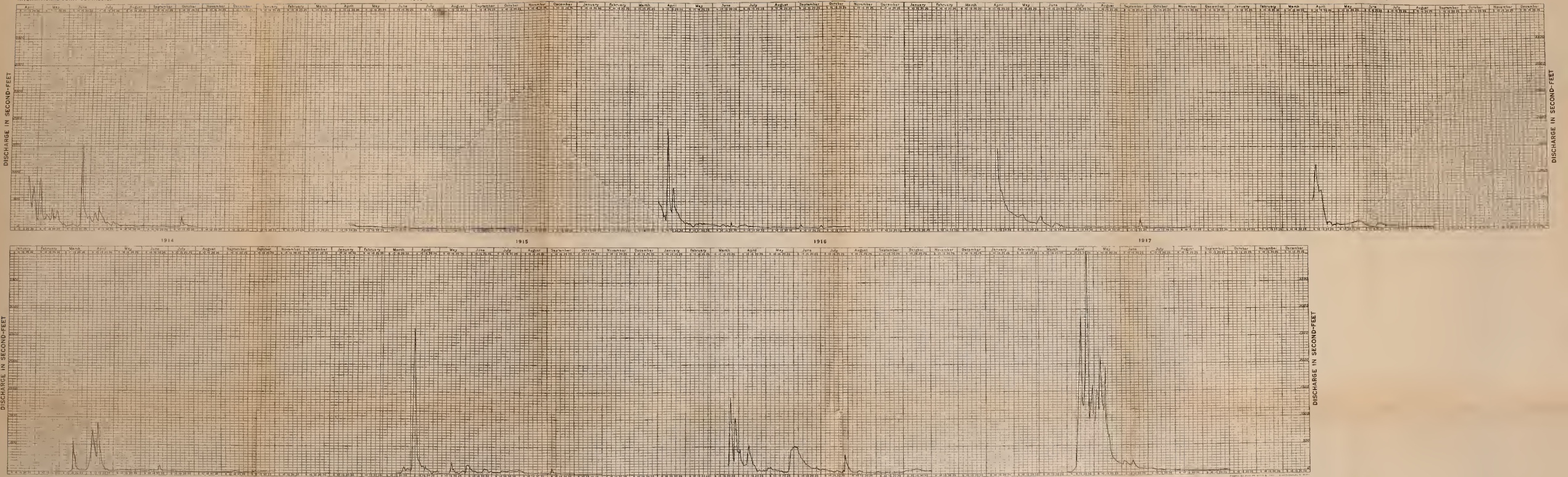
FLUCTUATIONS IN DISCHARGE OF MILK RIVER NEAR VANDALIA, MONT. 1915-1917



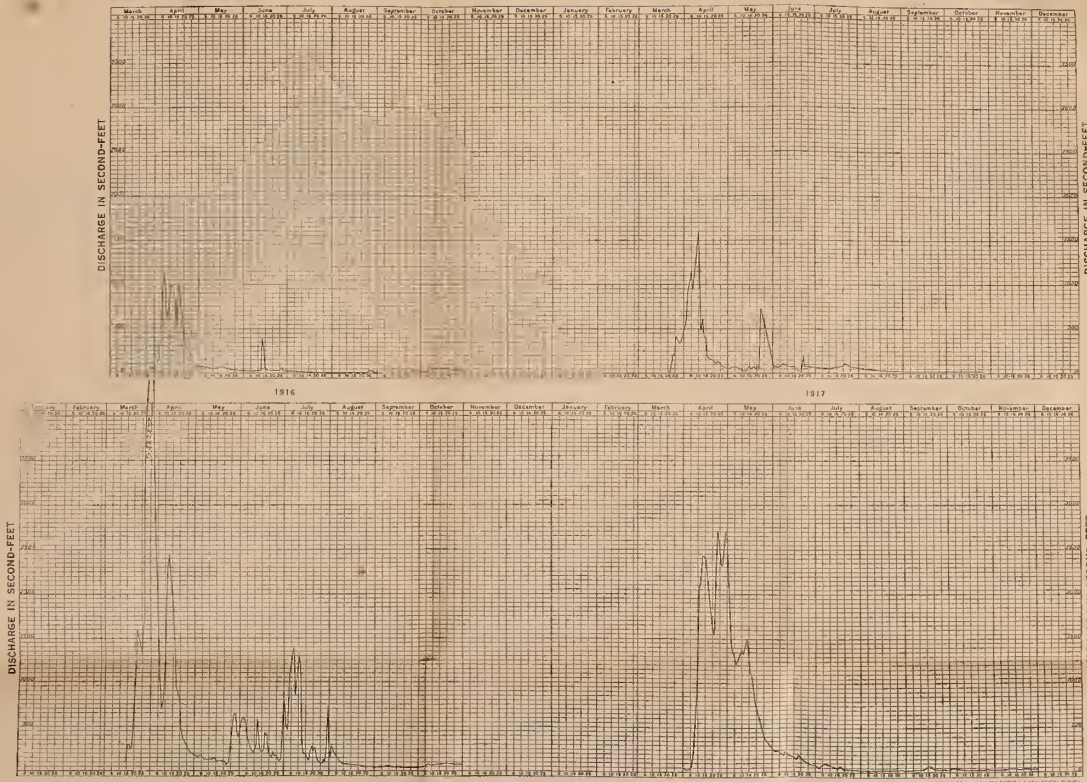
FLUCTUATIONS IN DISCHARGE OF LODGE CREEK NEAR INTERNATIONAL BOUNDARY, 1910-1915



FLUCTUATIONS IN DISCHARGE OF BATTLE CREEK AT NASH'S RANCH, SASKATCHEWAN, 1910-1917



FLUCTUATIONS IN DISCHARGE OF FRENCHMAN RIVER AT EASTEND, SASK., 1909 1917



FLUCTUATIONS IN DISCHARGE OF FRENCHMAN RIVER AT MARTIN'S RANCH, SASK., 1914-1917

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